MILITARY MEDICINE

Formerly:
THE
LITARY
RGEON

UNIVERSITY
OF MICHIGAN
MAY 15 1957
MEDICAL
LIBRARY
DOES NOT CIRCULATE

Washington, D.C.

VOL. 120 MAY 1957 NO. 5

64TH ANNUAL CONVENTION, HOTEL STATLER,
WASHINGTON, D.C., OCTOBER 28-30, 1957

Theme—"Professional Excellence—The Criterion of Military Medicine."

Sedatives { A.) hypothalamic — Reserpine
B.) cortical — Mebaral

A.) Indications
1. Emotional instability
2. Anxiety
3. Tension states
a.) Premenstrual
b.) Menopausal
c.) etc.

B.) Treatment - Tranquilize!

℞

Reserpine-Mebaral
Tablets

usual dose: 1 tab. 1 to 3 x daily

Each tablet contains
Reserpine - 0.15 mg.
Mebaral® - 30 mg.
(brand of mephobarbital)

Winthrop

VOL. 120 May, 1957 NO. 5

MILITARY MEDICINE

(*Formerly* THE MILITARY SURGEON)

Official Publication · Association Military Surgeons of the United States

President:
COL. AMOS R. KOONTZ
MC, Md., NG

Editor:
COL. ROBERT E. BITNER
U. S. Army Ret.

Published monthly and constituting two volumes annually.
Volumes commence with the January and July numbers.

Copyright ©, Association of Military Surgeons of U.S., 1957.

Contents

Original Articles:

Neurological Complications of Spinal Anesthesia 329
Max S. Sadove, M.D., Myron J. Levin, M.D., and Louis J. Oropallo, M.D.

Sudden Death Associated with Adrenal Myelolipoma, Obesity, Splanchnomegaly and Cirrhosis 335
Alfred Plaut, M.D.

Chemotherapeutic Studies of Hormone-Producing Tumors of Adrenal and Trophoblastic Origin 340
Roy Hertz, M.D.

Future Trends in Military Aviation Medicine 347
Ashton Graybiel, Capt. (MC), U. S. Navy

Surgical Uses of Saran (Vinylidene Chloride Vinyl Chloride) Co-Polymer Staple Fiber—A Preliminary Report 354
Irving Mauer, M.D.

Importance of Histologic Examination of Diseased Oral Tissues 356
George W. Greene, Jr., B.S., D.D.S.

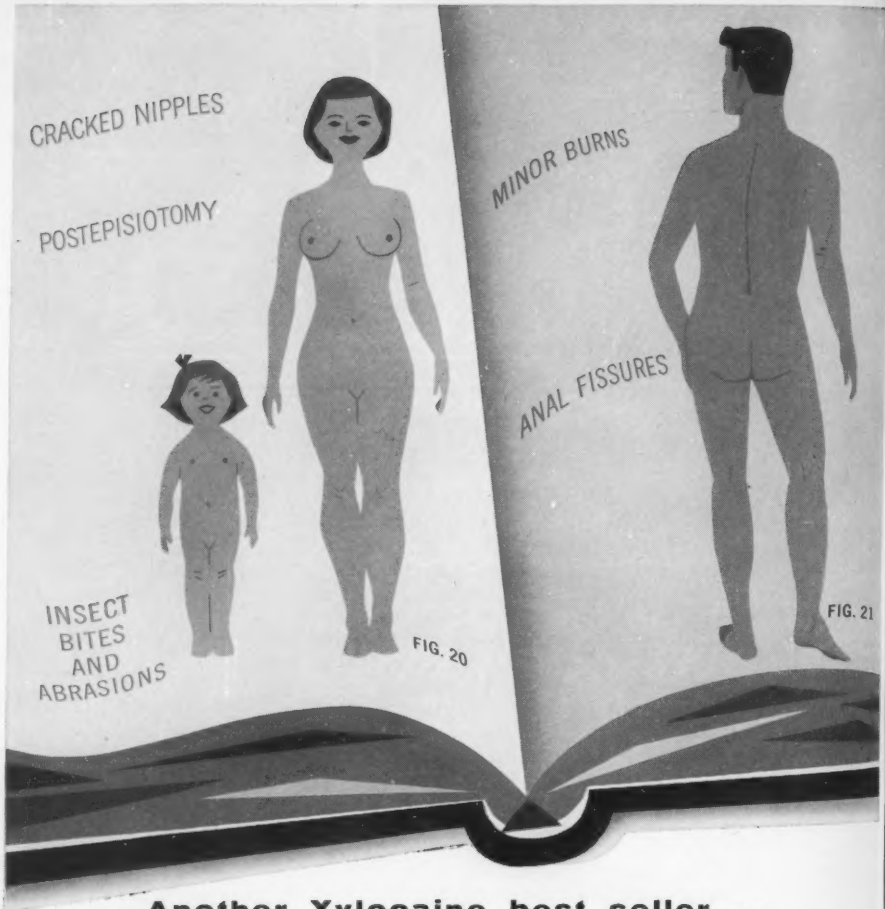
Principles and Methods in Teaching the Citizen Soldier 359
Charles A. Bryan, 2d Lt. MSC, Fla. NG

A Symposium on the Pathogenesis of Atherosclerosis 361
School of Aviation Medicine, Randolph AFB, Texas

Editorial 375
Around the World—Claudius F. Mayer, M.D. 377
Sustaining Members 381
Association Notes 382
Obituaries 392
The Sir Henry Wellcome Medal and Prize 394
Book Reviews 395
New Books 401
Index to Advertisers 6b

• Entered as second class matter at the post office at Washington, D.C., with additional entry at Menasha, Wisconsin. • Acceptance for mailing at special rate of postage provided for in paragraph 4, section 538 P. L. & R., authorized April 14, 1926. • Publication office: 450 Ahnaip Street, Menasha, Wisconsin. • Editorial and Executive Office: Suite 718, New Medical Building, 1726 Eye St. N.W., Washington, D.C. • Advertising Representative: 280 Madison Ave., New York 16, N.Y. • Subscription $7.50 a year for the United States. Elsewhere throughout the world, $8.50. Current copy, 75 cents. Subscriptions payable in advance. Membership dues (including subscription to MILITARY MEDICINE) $6.00. Checks should be made payable to The Association of Military Surgeons, U.S., and not to any officer personally. • *The addresses of members and subscribers are not changed except upon request.* In every case the old as well as the new address should be given. Requests for change of address must reach the Secretary before the fifteenth of the month to be effective for the following issue. • Requests for reprints should be made at the time of forwarding article. Authors alone are responsible for the opinions expressed in their contributions. Printed in U.S.A.

2f



Another Xylocaine best seller...

Never before has a surface anesthetic provided such prompt, effective, and long-lasting action as Xylocaine Ointment. Its water-soluble, nonstaining, carbowax base melts on contact with the skin, thus releasing the anesthetic for intimate action on the tissues.

Xylocaine Ointment is nonirritating, nonsensitizing, and does not inhibit the healing processes.

Astra Pharmaceutical Products, Inc., Worcester 6, Mass., U.S.A.

for better doctor-patient relationship

XYLOCAINE®
(brand of lidocaine*)
OINTMENT 5% ASTRA

*U. S. PATENT NO. 2,441,498

VOL. 120 May, 1957 NO. 5

MILITARY MEDICINE

ORIGINAL ARTICLES

Authors alone are responsible for opinions expressed in their contributions

Neurological Complications of Spinal Anesthesia*

An Eight Year Study of More Than 16,000 Consecutive Cases (1948-1955)

By

MAX S. SADOVE, M.D.,† MYRON J. LEVIN, M.D.,‡ AND LOUIS J. OROPALLO, M.D.§

Hines, Illinois

A PREVIOUS paper[1] dealt with *Neurological Complications of Spinal Anesthesia* in 10,166 consecutive cases covering 4 years, 1948-51, inclusive, in one Veterans Administration Hospital. The study has been extended by 4 additional years to 1955 and now totals 16,139 cases.

These cases represent all the spinal anesthetics administered in the hospital during the years 1948-55 inclusive. The current study was made by the same personnel who participated in the initial study of 10,166 cases. Again as in the first instance, only neurological complications were sought.

The statistical data will be divided into the same categories as in the initial study. The types of complications sought were as follows:

1. Cerebro-Vascular Accident within 10 days of spinal anesthetic
2. Transverse myelitis (para or quadriplegia)
3. Radiculitis
4. Peripheral nerve lesions
5. Foot drop
6. Persistent headache (longer than 1 week)
7. Neuritides
8. Paralyses
9. Muscular weakness
10. Arachnoiditis, Meningitis, Meningismus
11. Deafness
12. Strabismus or other cranial nerve lesions
13. Herniated intervertebral disc
14. Persistent lower bowel and bladder dysfunction
15. Cauda equina syndrome
16. Chronic backache
17. Any other neurologic conditions.

The administration of the anesthetics was conducted by a large group of individuals varying widely in experience, training and manual dexterity. Some were anesthesiology consultants, others staff or attending anesthesiologists, still others anesthesiology residents, and finally, surgical residents assigned to the Anesthesia Service for a three-month training period.

*Presented by Doctor Levin at the 63rd Annual Convention of the Association of Military Surgeons of the United States, Hotel Statler, Washington, D.C., Nov. 12-14, 1956.

†Professor of Surgery (Anesthesia) and Chief, Section on Anesthesia, University of Illinois College of Medicine.

‡Clinical Assistant Professor of Anesthesia, University of Illinois College of Medicine.

§Now on active duty—Cdr, MC, USN., Phila. Navy Yard.

Operative notes and discharge summaries of all patients who were given spinal anesthesia during the years listed were carefully read. All records of subsequent admissions of these same patients up to the present time were likewise perused. Nearly one thousand complete charts were also carefully screened since in these there was a diagnosis of one or another neurologic disorder in the chart. It was obvious on inspection of the records that in all but 29 cases there was no possible connection with spinal anesthesia. These 29 cases form the basis of this paper.

The remainder of the 1000 cases studied in detail were ruled out as complications on the basis of one or more of the following reasons:

1. The neurologic disease existed prior to administration of spinal anesthesia, and was unchanged thereby.
2. The neurologic disorder was obviously due to causes other than spinal anesthesia—e.g. trauma.
3. Death had no connection with anesthesia.
4. Death was due to complications other than neurologic disorder.
5. The only complication was post-spinal headache of less than seven days duration—an arbitrary choice on our part, to be discussed further below.

Of the 29 cases selected as possible spinal complications, seven were ruled out on closer inspection of the records. Five of these were reported in detail in a previous paper.[1] The remaining two will be discussed here.

(1) EMS, a 50 year old male, underwent cholecystectomy and appendectomy July 28, 1953, under continuous spinal anesthesia with 4% procaine. Postoperatively the patient failed to regain use of his legs. Laminectomy was performed on July 30, 1955 at which time a tumor was found to be compressing the spinal cord. Biopsy of the tumor was made and diagnosed as Hodgkin's Disease. This diagnosis had been unsuspected, but a few days subsequently, a record of a former admission which had been misfiled was found and it was noted that on Dec. 22, 1952, eight months previously, this diagnosis had been made on lymph-node biopsy. The patient remained paraplegic and expired on May 24, 1954 in spite of therapy for Hodgkin's Disease.

The spinal anesthesia may have precipitated an earlier onset of paraplegia in this patient, but from the size of the spinal tumor the end result was inevitable whether or not it had been done. It is regrettable that the information as to the patient's diagnosis was not made available prior to surgical intervention, but even in the best regulated teaching institutions this can occasionally occur.

(2) WS, a 36 year old male, underwent hemorrhoidectomy under spinal anesthesia on April 28, 1955. He was discharged asymptomatic one week later. Five months later on October 17, 1955 he was readmitted with complaints of "blackout episodes." Work-up at this time resulted in a diagnosis of grand-mal epilepsy, probably secondary to a space-occupying lesion of the left fronto-parietal region. The patient is still being followed-up as a brain-tumor suspect. Surgery was not performed as the lesion could not be demonstrated either by means of carotid or vertebral angiograms or pneumoencephalogram.

While it is possible theoretically that this patient's symptoms could be secondary to his spinal anesthesia, there are a number of reasons to rule this out. First, the anesthetic agent was administered with the patient in the sitting position and the height of anesthesia at its most profound level was never above the 12th thoracic segment. Second, there was no evidence of arterial hypotension at any time during or immediately following anesthesia, which might have resulted in cerebral thrombosis. Third, the patient's age and general physical condition were such that even had a transitory hypotension developed, one would not anticipate the occurrence of a cerebrovascular accident. Fourth, the onset of symptoms of this type was at a time sufficiently remote from the

administration of the spinal that any connection with this event is unlikely. In the event of arachnoiditis or cauda equina syndrome, however, this time relationship would not necessarily hold true.

The twenty-two true neurologic complications in the series of 16,139 cases fell into five rather broad categories. Since some of these have been discussed at length in a previous paper[1] they are presented here in two groups. Those occurring in the 1952-1955 portion of the series will be discussed here.

Table 1 shows total neurological complications encountered in both studies. These represent the only neurological complications encountered in the total series of 16,139 cases over an eight year space.

TABLE 1

TOTAL NEUROLOGICAL COMPLICATIONS ENCOUNTERED IN 16,139 CASES OF SPINAL ANESTHESIA

	1948–51	1952–55	Total
Cer. Vas. Accid. within 10 days of Anes.	4	2	6
Meningitis with recovery	1	1	2
Persistent Headache (over 1 week)	3	5	8
Chronic Backache	2	0	2
Cardiac Arrest	3 (1 recovery)	1	4 (1 recovery
TOTAL	13 0.13%	9 0.15%	22 0.13%

Category 1. There were 6 cerebro-vascular accidents within ten days of anesthesia. One of these is to be discussed now.

CFMcG, a 61 year old male, had a transurethral prostatic resection on Feb. 10, 1955 under pontocaine—epinephrine spinal anesthesia. Two hours postoperatively he was returned for fulguration of bleeding points in the bladder. The spinal analgesia was wearing off, but was sufficient for this. During the fulguration, patient had a transitory hypotensive episode during which his blood pressure fell from 120/80 to 50/40 rising quickly to 130/80 on administration of oxygen by mask. The same evening, approximately 8 hours after the first resection, a diagnosis of urinary extravasation was made and suprapubic cystotomy was done under general anesthesia. During these various procedures 1,500 cc of whole blood and 500 cc of 6% dextran were administered to the patient. During the evening he became very restless and was given 75 mg. of demerol® on order of the surgical O.D. in addition to the oronasal oxygen he had been receiving. He expired at 2:15 A.M., Feb. 11, 1955, approximately 16 hours after receiving his spinal anesthetic. Autopsy was refused but diagnosis of cerebro-vascular accident was made.

This case is representative of many that are blamed on the spinal anesthetic. This patient was severely traumatized, with three surgical procedures in one day. He was subjected to hemorrhage, urinary extravasation, and blood transfusion, a general anesthetic in addition to the spinal, and last but far from least, the administration of a large dose of narcotic to "relieve restlessness" that probably was due to cerebral hypoxia. Any one of these insults could be as guilty in causing his demise, and were in all probability more so, than was the spinal.

The second case, which will not be reported in detail was in many respects similar to the above in that it involved a cerebrovascular accident following transurethral resection. In this case the patient was a diabetic arteriosclerotic with a history of previous cerebrovascular accident.

Category 2. Meningitis with recovery. TB, a 56 year old male, underwent trans-

urethral prostatic resection on April 22, 1955 under spinal anesthesia. Four days later he developed low grade fever, and mental confusion which gradually increased, and subsequently developed nuchal rigidity and signs of meningeal irritation. On May 10, 1955 Klebsiella was cultured from both urine and cerebro-spinal fluid. Patient was treated with heavy dosage of antibiotics and was discharged as recovered on December 15, 1955. This patient was a diabetic and tertiary luetic with somewhat lowered resistence to infection so that it is somewhat dubious as to the etiology of the CNS infection—i.e. whether it was systemic or direct. Lacking evidence to the contrary, however, it must be included as a *possible* contamination by the lumbar puncture.

Category 3. Persistent headache over one week. Cases of headache of less than one week's duration were not considered worthy of inclusion in this study. Even though they are extremely unpleasant and undesirable and are certainly complications of spinal anesthesia, probably the commonest, they are not part of the problem we chose to study. When the duration was more than one week (an arbitrary time) we considered them as neurological complications. There were five such in the second portion of our series.

Category 4. Chronic Backache. Two cases were reported in the first half of the series. None were found in the second half.

Category 5. Cardiac Arrest. There were 3 in the first portion with one recovery. These were discussed fully in the previous paper. The one which occurred in the second part of the series resembles the one who recovered in some respects but this time the outcome was different:

FH, age 25, was given continuous spinal anesthesia April 21, 1954 for ruptured appendix. Two doses of 4% procaine consisting of 80 and 40 mg. were given during a 50 minute period. The patient was apparently doing very well when suddenly, as the abdomen was about to be closed, his pulse stopped—patient lost consciousness—the blood pressure fell to zero and respiration ceased. Cardiac resuscitation was undertaken through a thoracotomy at once and he resumed spontaneous cardiac rhythm and respiration but failed to regain consciousness. He died 3 days later.

It is difficult if not impossible for us to explain the demise of this patient who was a young, otherwise healthy manual laborer. We have no choice however, but to include his case as a complication of spinal anesthesia. We are at a loss, however, to explain why prompt, efficient cardiac resuscitation was ineffectual in affording a recovery in this case.

Comment

Courville[2] in a recent study states that "Evidence has accumulated over the years which seems to demonstrate that serious and ultimately lethal damage to the spinal cord and its investments may occur as a direct consequence of spinal anesthesia." He further states that "the most common complication is the so-called cauda equina syndrome which in its more chronic stages becomes a chronic adhesive spinal arachnoiditis." He arrives at the conclusion after studying several cases at autopsy, that the neurologic damage in these cases is due to a chemotoxic effect—i.e. the direct consequences of the action of the drugs used on the tissues of the spinal cord and meninges, and that the frequency and severity of the neurological damage encountered is proportional to the concentration and volume of anesthetic agent injected. He feels that the anesthetic agent per se is responsible for the complications, and that chemical contaminants such as soap, detergents, sterilizing agents, etc., have relatively little to do with this. He comments on the widely different morbidity statistics in the series of different authors but fails to explain this in any way.

Our experience parallels the excellent study done by Dripps and Van Dam[3] who felt that careful technic was a very important feature in avoiding morbidity following spinal anesthesia. We feel as do they that too much attention cannot be given to this aspect of the problem.

It is our contention that a very important part of the low morbidity in our series of cases is the technic of administration of spinal anesthesia. For this reason a brief résumé of our method will be given here:

All spinal anesthesia trays including the drugs are double thickness wrapped and autoclaved. Sets are re-sterilized after a maximum of one week shelf storage. Drugs are discarded after one sterilization if not used.

Nothing is used when there is any doubt as to its sterility. Any questionable material is discarded. Nothing is injected into a patient's back unless it has been taken from a freshly opened sterilized ampule. Ampules are sterilized by autoclaving with the exception of thermo labile substances such as epinephrine. These are sterilized by immersion for a minimum of 24 hours in a deeply red colored solution (Tr. Zephiran® 1:1000). The red color is important in that it materially assists in detecting contaminated or faulty ampules. An ampule may absorb the red dye even though no other evidence of leak is detectable. Any doubtful ampules are discarded. When in doubt we err on the side of caution.

The back is shaved when necessary. The skin is prepared with Tr. of Zephiran®. Gowns are not worn and hands are not scrubbed, but sterile gloves are worn and great care is taken to protect them from contamination. Skin sterilizing solutions are never placed inside the spinal trays for fear of contaminating the needles, etc., with them. The 1% novocaine® used for skin wheals is removed from sterile 1 cc ampules rather than from cheaper but less safe bulk bottles.

Rigid rules are followed as to concentrations of drugs injected. Only sterile, individual dose ampule medications are employed for spinal anesthesia. Pontocaine®, Novocaine®, and Nupercaine® are all used as well as several newer drugs such as Sympocaine®. When epinephrine is added to a spinal anesthetic it is removed from a sterilized 1 cc ampule, not from a stock bottle. The 10% dextrose used for dilution and "weighting" is used only from sterilized 3 cc ampules prepared especially for spinal anesthesia. The recommended safe dosages and concentrations are never exceeded. It cannot be determined at this point which are the important factors in technic. It is felt however, that any technic which did not employ at least these basic precautions would border on carelessness.

Summary and Conclusions

An eight-year consecutive series of 16,139 spinal anesthetics administered during the years 1948-1955, inclusive, was studied for evidence of neurological complications. Twenty-two such complications were found. Six cerebro-vascular accidents within ten days of anesthesia occurred. Two patients had meningitis with recovery (one aseptic, one bacterial). Eight patients had post spinal headaches lasting longer than one week. Two developed chronic backache and four cardiac arrests occurred with one recovery. The fatal complications were 5 in number—three of the cardiac arrests and 2 of the cerebrovascular accidents.

The cases of cardiac arrest and chronic backache are perhaps not true neurologic complications, but since they could not be ruled out as being of central origin, we felt that we must include them in the report.

The findings represent the experience of a group of average training in a reasonably well run hospital, using careful technics. No attempt is made to draw any conclusions from this data.

It is still our feeling as after the initial part of this study, that the neurologic sequelae of spinal anesthesia are not of such magnitude as to warrant the indictments of this anesthetic technic which have been made by those who are opposed to its use, provided results similar to those reported above are obtained. If this investigation had shown more numerous complications or more serious ones, this conclusion would not have been drawn.

It has been and continues to be our experience that morbidity and mortality with

spinal anesthesia compares favorably with those with other anesthetic technics.

ACKNOWLEDGMENT

The authors express their grateful appreciation for the assistance afforded them in the compiling of the statistical data by Miss Marguerite I. White, Mrs. Beatrice W. Sayles and Mrs. Ann Barnes.

REFERENCES

[1] Sadove, M. S. and Levin, M. J.: Neurological Complications of Spinal Anesthesia—Ill. Med. J. 105:4, Apr. 1954.

[2] Courville, C. B.: Untoward Effects of Spinal Anesthesia on the Spinal Cord and its Investments. Anes. and Analg. 34:6, Nov.-Dec. 1955.

[3] Dripps, R. D. & VanDam, L. D.: Long Term Follow-Up of Patients who Received 10,098 Spinal Anesthetics. J.A.M.A. 156:1486-91, 1954.

AMERICAN
CANCER
SOCIETY

Sudden Death Associated with Adrenal Myelolipoma, Obesity, Splanchnomegaly and Cirrhosis

By

ALFRED PLAUT, M.D.

Armed Forces Institute of Pathology, Washington, D.C.

(With four illustrations)

THAT a case is unique may not be adequate reason for recording it in the medical literature, but if an analogous one has been reported, the two should be brought together in the interest of those who are attempting to interpret similar obscure cases. This is most applicable to the category of sudden, unexpected death, for the very terminology indicates the paucity of information concerning causative factors.

CASE REPORT

AFIP Accession No. 674620. (Most of the data were obtained from members of the family after the patient's death.)

This 35-year-old white man was one of thirteen healthy siblings, four of whom are moderately obese. The father, who also was rather fat, died at the age of 54 from "an abscess in the abdominal wall after an accident." The mother is 63 years old and in good health. The patient had always been fat, but not grossly so. He made average marks in school and played like other boys. As a young man he did hard manual labor. He served in the Army from 1942 to 1947 but was not sent overseas. During these years he became much more obese. Since 1947 he had worked as a checker and truck driver in a dairy. He was a good worker, quick at figuring. Although he got drunk every payday, he did not drink on other days.

In 1947 he was admitted to the Veterans Administration Hospital, Topeka, Kansas, for phlebothrombosis and lymphedema of the left leg, which subsided under conservative treatment and apparently did not recur. At that time obesity was the only abnormality observed on physical examination; his height was 5′ 9″; his weight 272 pounds. Blood pressure was 110/70; x-rays of chest and sella turcica were negative; the electrocardiogram revealed nothing of note. During the seven weeks the patient remained in the hospital he lost 24 pounds on an 800 calorie diet. His hemoglobin was 15 gm. per 100 cc.; hematocrit 50 per cent.

Four weeks before his death he fell asleep while smoking and burned his left leg. In the last week of life he was drowsy, even falling asleep while in company. It was said that he had a cough.

At 7:30 P.M. on December 19, 1952, his physician noted that he was slightly feverish and seemed to be in circulatory failure. He was given 1.2 mg. digitoxin by mouth and 2 cc. mercuhydrin intramuscularly, and two hours later he was lying on a divan and perspiring freely. At midnight he was found "unconscious," having fallen off the porch. It is not known whether he was living or dead on arrival at the hospital within the next half hour.

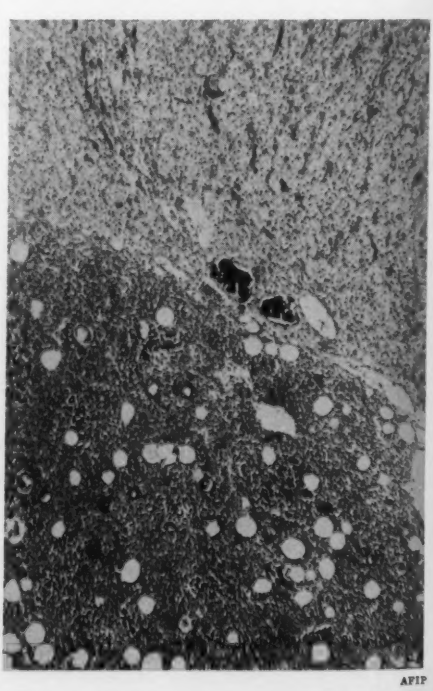
The autopsy was started approximately ten hours after death. The body, which measured 5′ 9″ (176 cm.), weighed 348 pounds (159 kg.). The cheeks appeared to rest directly on the clavicles. A deep intertriginous fold ran across the abdomen a few centimeters above the upper border of the pubic hair. The penis was hidden in the fat, only the foreskin protruded. Body hair and scrotum were normal. Nose, chin and ears were small, and so were the hands and feet. Both legs, from the knees downward, showed tense edema; the skin over the left tibia was dry, cyanotic and somewhat brown. The edematous bulbar conjunctiva protruded over the limbus.

AFIP

FIG. 1. Cross section of adrenal gland with central myelolipoma. The medium dark areas in the myelolipoma are cellular marrow with hemorrhage. The black dots are calcifications, all outside the myelolipoma. Hematoxylin-Eosin, 10×.

The fat over the sternum was 3 cm. thick, the abdominal fat 8 cm. The fat was pale yellow and coarsely lobulated; there were no circumscribed lipomas. Masses of fat protruded as the peritoneum was incised. The abdominal organs were normally disposed. The lungs (left 600 gm., right 800 gm.) appeared grossly normal; their dependent portions were deeply hyperemic. One thrombosed subpleural vessel was felt. The large heart (650 gm.) appeared twisted, with the right border obliquely forward. The wall of the left ventricle was 2.2 cm. thick, that of the right, 1.4 cm. The aorta, which appeared narrow, was thin-walled, easily stretched, almost free of atherosclerosis, and the large abdominal arteries were normal. The femoral veins, in their uppermost portions, contained fluid blood and postmortem clot. A firm, elastic, purplish lymph node, 2 cm. long, was attached to the femoral vein in the left fossa ovalis. The aryepiglottic folds were slightly edematous. Only a small central portion of the thyroid cartilage was osseous. The thyroid and the parathyroid glands were apparently normal. A thymus could not be outlined with certainty in the thick masses of mediastinal fat. The spleen (400 gm.) was large, firm and cyanotic; irregular protrusions on its cut surfaces may have corresponded to follicles. The adrenal glands, after being freed from the abundant surrounding fat, weighed 13.5 gm. (left) and 15 gm. (right). Both were composed of broad, uninterrupted yellow layers; no pale gray medulla was seen. Small, obviously calcific masses were palpable in both glands, but were more numerous in the left. The center of the right adrenal gland was occupied by a spherical, glassy, dark gray and red mass, 1 cm. in diameter. The liver was huge (3240 gm.), and so were the kidneys (left 350 gm., right 355 gm.) and the pancreas (280 gm.). The other organs, including the brain (1500 gm.), were not remarkable in the gross. The pituitary gland weighed 0.74 gm. The penis and the testicles were of normal size.

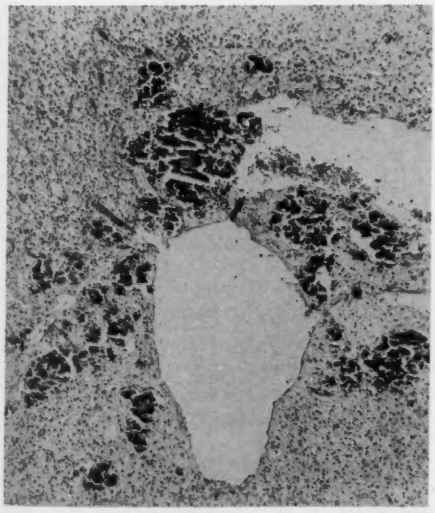
Of the microscopic findings, only the unusual ones will be mentioned. There was no one outstanding inflammatory lesion, but the



AFIP

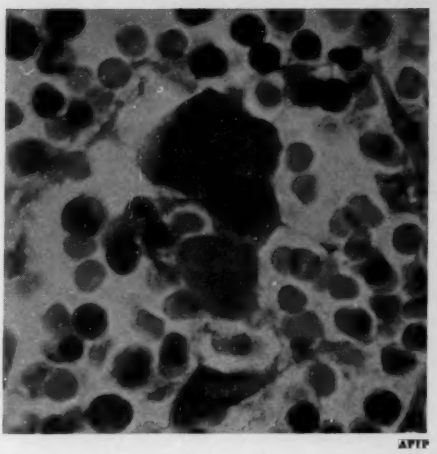
FIG. 2. Normally layered cortex and hemorrhagic mixed bone marrow. The outline between the two is more distinct in this field than in most others. Two calcific masses. Hematoxylin-Eosin, 48×.

outer layers of the urinary bladder and some adjoining fat tissue contained many leukocytes and plasma cells; plasma cells were numerous in lymph nodes, and there were a few, partly organized, small foci of pneumonia. The liver gave a picture of cirrhosis that was not entirely convincing, in addition to severe stasis with central atrophy and fatty change that was principally midzonal. In the lungs, many medium sized arteries were wide and tortuous and showed irregularities in the arrangement of musculature and of elastic lamellae. The picture resembled somewhat that of so-called arteriovenous aneurysm. The most striking changes were found in the adrenal glands. The central nodule consisted mainly of fatty tissue that was not lobulated and of myeloid cells, including megakaryocytes. It was neither encapsulated nor sharply demarcated from the surrounding, normally layered, cortex. Only one small piece of bone was found after long search, and it was not connected with the myelolipoma or with the calcific deposits. The latter were scattered irregularly, obviously having originated in the connective tissue; they became dark gray in the von Kossa stain and intensely purplish-red with alizarin. Very little medulla was found in the numerous sections, and only one vein showed thick muscle.



AFIP

FIG. 3. Calcification in cortex near a wide Vein. No medulla, no thick muscle bundles in the wall of veins. Van Gieson, 81×.



AFIP

FIG. 4. Cellular marrow with megakaryocyte in myelolipoma. Hematoxylin-Eosin, 2137×.

COMMENT

The difficult problems of myelolipoma, defect of medulla, and calcification of adrenal will not be touched on, for discussing them is not the purpose of this report. My aim is to bring this case into juxtaposition with an analogous case to show that this uncommon adrenal lesion, together with splanchnomegaly and constitutional obesity, can predispose to unexpected sudden death. The probability that this is mere coincidence is exceedingly small.

The case that presents the analogy was reported by K. L. Schmidt.[1] The patient was a 53-year-old streetcar conductor, who had not been ill for twenty years. He collapsed while working, fell off the open platform of the car and was dead. At autopsy "enormous universal obesity" was found, also a large heart, splanchnomegaly, early cirrhosis of the liver, swelling of the brain, edema of the lungs, and a partly hemorrhagic myelolipoma, the size of a walnut, in the left adrenal. The right adrenal was normal. No weights

or measurements are recorded in this short report, and the slides and protocols are not available.

The similarity of the two cases is obvious.

Attempts to explain such a sudden death satisfactorily are hopeless, and the considerations or analogies presented will hardly lessen the mystery. Which of the several abnormalities was the most important factor in the sudden death is a question that cannot be answered. One might even doubt the validity of the question, assuming that the whole constitution—which is more than the sum of the single factors—must furnish the explanation, or that the most important factor could be a neurochemical one, without obvious morphological manifestations. In this respect, the abnormality of pulmonic vessels can be dismissed, for it is absent in the only comparable report, and pulmonary arteriovenous aneurysm is not mentioned in the literature on sudden death. The pulmonary lesion probably had existed for a long time, as indicated by the hypertrophy of the right ventricle and by the hematological findings. The small, scattered, partly organized foci of pneumonia, the unexplained inflammation outside the urinary bladder, and the plasma cells in lymph nodes do not appear important in relation to the sudden death, unless perhaps as a possible trigger mechanism.

Excessive obesity, splanchnomegaly, or the two combined, have not, to my knowledge, been cited as the sole cause of sudden death; neither has adrenal myelolipoma or partial adrenal calcification. But unilateral adrenal lesions have occasionally represented the only abnormality observed at autopsy in cases of sudden death. The most striking example was that of Trillot and Valatx:[2] A 30-year-old miner, while eating with his comrades, suddenly felt a pain in the chest, choked, and died a few seconds later. Hemorrhagic destruction of the slightly fibrotic left adrenal gland was the only abnormality observed at autopsy; the right adrenal was normal. Similar considerations apply to the case of Harbitz.[3] A 28-year-old man, who was said to have dystrophia myotonica, was nevertheless running to catch a train. Suddenly he fell dead in the snow. At autopsy, scattered small submucous and subserous hemorrhages were found. The right adrenal gland, which weighed 8 gm., looked normal from without, but its medulla was atrophic and fibrotic. The left adrenal gland weighed only 3 gm.; its medulla was thin, fibrotic, partially calcified and ossified. No statement is made about the aspect of the cortex.

The mechanism of such "adrenal death" —sudden or not—is unclear. Virchow[4] pointed to the nearness of the solar plexus. But since Virchow's patients had "died rapidly with typhoid-like manifestations," they probably were victims of meningococcemia. Schmidt[1] considered the possibility that the myelolipoma or the hemorrhage might have led to a sudden outpouring of adrenalin, thus causing sudden death. His reasoning cannot be applied to my case, since very little adrenal medulla was found. Neither can lack of adrenal medulla be considered a decisive factor, since it has been reported repeatedly in cases in which the myelolipoma was found incidentally at autopsy (Gormsen[5]). The paucity of the musculature of adrenal veins may correspond to the defect of adrenal medulla. Our ignorance concerning the importance or function of this muscular apparatus and the scanty attention it has received in the literature preclude further discussion of this point.

Summary

A syndrome consisting of extreme obesity, splanchnomegaly, cirrhosis-like changes in the liver and adrenal myelolipoma can predispose to sudden, otherwise unexplained, death. One case is reported, another almost identical one cited from the literature.

References

[1] Schmidt, K. L.: Fettgewebshaltige Knochenmarkneubildung in der Nebenniere und plötzlicher Tod. Centralbl. f. allg. Path. u. path. Anat. 58: 401, 1933.

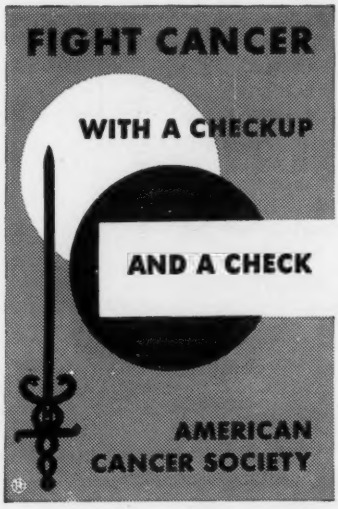
[2] Trillot, J., and Valatx, A.: Mort rapide sur

les lieux du travail, hémorragie de la surrénale révélée par l'autopsie. Annales de Med. légale 30: 168, 1950.

[3] Harbitz, Fr.: Ueber plötzlichen Tod mit natürlicher (d.h. nicht gewaltsamer) Todesursache, insbesondere bei jungen Leuten. Skrifter utgift av det Norske Videnskaps Akademi i Oslo, Mat. Naturev. Klasse 5:1, 1938.

[4] Virchow, R.: Die Krankhaften geschwülste, Berlin, Hirschwald, 1867, vol. 2, p. 696.

[5] Gormsen, H.: Über das Vorkommen von hämopoetischem Gewebe in der menschlichen Nebenniere. Virchows Arch. f. path. Anat. 310:369, 1943.



SYMPTOMS AND SIGNS OF POSSIBLE MALIGNANT DISEASE

UNUSUAL BLEEDING OR DISCHARGE
A LUMP OR THICKENING IN THE BREAST OR ELSEWHERE
A SORE THAT DOES NOT HEAL
PERSISTENT CHANGE IN BOWEL OR BLADDER HABITS
PERSISTENT HOARSENESS OR COUGH
PERSISTENT INDIGESTION OR DIFFICULTY IN SWALLOWING
CHANGE IN A WART OR MOLE

American Cancer Society

Chemotherapeutic Studies of Hormone-Producing Tumors of Adrenal and Trophoblastic Origin

By

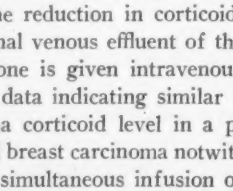
ROY HERTZ, M.D.

National Institutes of Health, U. S. Public Health Service, Bethesda, Md.

(With sixteen illustrations)

TUMORS which produce specific and measurable hormonal secretions have special interest for the chemotherapist because their hormonal production may be used as a quantitative index of therapeutic effectiveness. A good example of such tumors are those arising from the adrenal cortex. Like normal adrenocortical tissue they produce glucocorticoids, mineralcorticoids, estrogens and androgens and these may be produced in varying proportions and in variable quantities. Fortunately we are now able to quantitate the level of these hormones in the blood and urine by either chemical or biological methods.

Although we have had for some years effective chemical agents for the suppression of thyroid function, such as propylthiouracil or tapazole, compounds which can suppress adrenocortical function in a similar manner have only recently been developed in our laboratory. Amphenone,[1] a diphenyl compound whose formula is shown in Fig. 1, has been shown to suppress adrenal cortical secretion in the rat, dog, and man. Fig. 2 shows the reduction in corticoid content in the adrenal venous effluent of the dog when Amphenone is given intravenously.[2] Fig. 3 presents data indicating similar suppression of plasma corticoid level in a patient with advanced breast carcinoma notwithstanding a constant simultaneous infusion of an otherwise maximally effective dosage of ACTH.[3] In 12 patients with adrenal carcinoma we have found that Amphenone will suppress the corticoid production of such tumors and will reduce the major metabolic effects of



1, 2 - bis (p - Aminophenyl) -2- Methylpropanone -1- Dihydrochloride

FIG. 1. Amphenone formula.

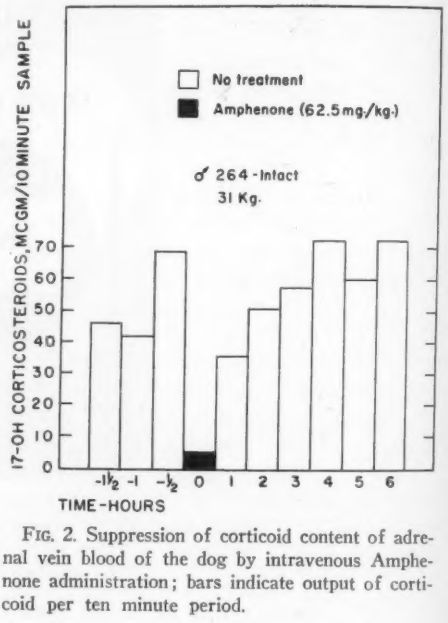


FIG. 2. Suppression of corticoid content of adrenal vein blood of the dog by intravenous Amphenone administration; bars indicate output of corticoid per ten minute period.

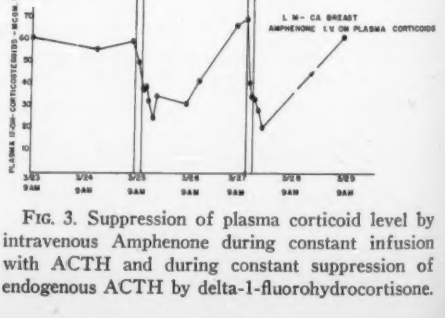


FIG. 3. Suppression of plasma corticoid level by intravenous Amphenone during constant infusion with ACTH and during constant suppression of endogenous ACTH by delta-1-fluorohydrocortisone.

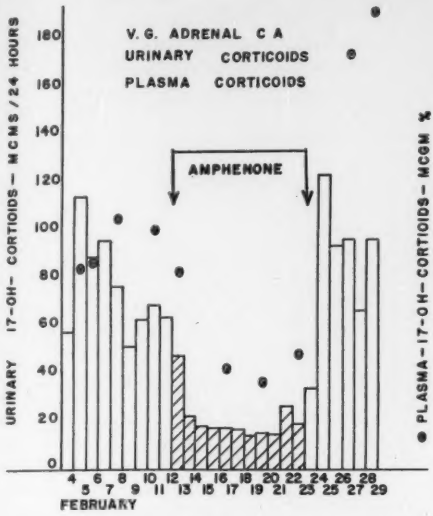


FIG. 4. Reduction of urinary and plasma corticoid in patient with adrenal carcinoma on 6 to 8 grams oral Amphenone daily; note marked rebound on stopping Amphenone.

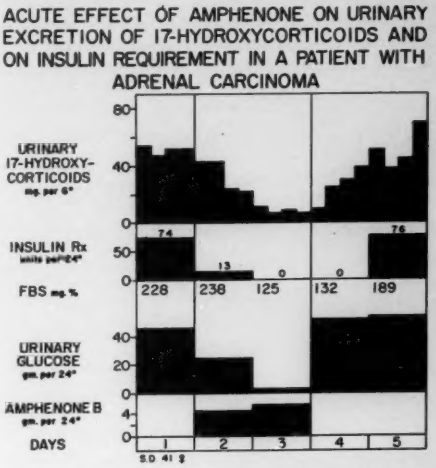


FIG. 5. Immediate effect of Amphenone B on the urinary excretion of 17-hydroxycorticoids and on insulin requirement in a patient with adrenal carcinoma.

hyperadrenocorticism such as hypertension, diabetes, disturbed electrolyte balance, and marked nitrogen loss due to the protein catabolic action of the excess corticoid. Fig. 4 shows an example of the Amphenone-induced depression in both urinary and blood corticoid levels in one of those patients with adrenal carcinoma. When Amphenone is discontinued there is a sharp rebound in the corticoid titres to levels exceeding the pretreatment level. This rebound is accompanied by exacerbation of the metabolic and mental features of hyperadrenocorticism. Figs. 5, 6, and 7 present similar observations in additional cases of hyperadrenocorticism due to tumor or hyperplasia. In marked contrast, we find that the androgenic function of the adrenal gland even in such anomalous states as adrenal hyperplasia is not materially altered by Amphenone. This is manifested by only limited effects on the ketosteroid excretion and reflects a relatively high degree of specificity in the action of Amphenone upon the biosynthesis of the multiple adrenal steroids. Fig. 8 presents a scheme for the formation of these respective steroids. It is our working hypothesis that Amphenone blocks some of the final steps in the formation of the glucocorticoids.

Fig. 9 demonstrates the suppression of aldosterone production by Amphenone together with the associated effect on electrolyte balance.

It is noteworthy that Amphenone not only obstructs these phases of adrenal function but it simultaneously blocks thyroid function

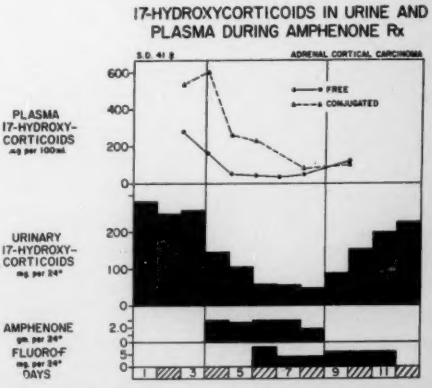


FIG. 6. Reduction in plasma and urinary corticoids in patient with adrenal carcinoma during 5-day course of Amphenone.

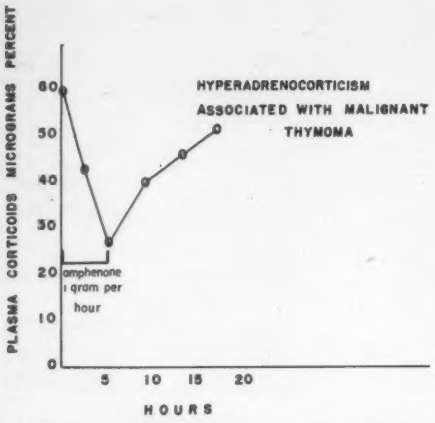


FIG. 7. Reduction of plasma corticoid level following acute intravenous Amphenone administration.

as manifested by a suppression in radioiodine uptake, depression in B.M.R. and protein-bound-iodine and an elevation of serum cholesterol. Thus we are obliged to look for the common pathway whereby Amphenone suppresses the function of both the thyroid and adrenal.

Unfortunately, the toxic side-effects of

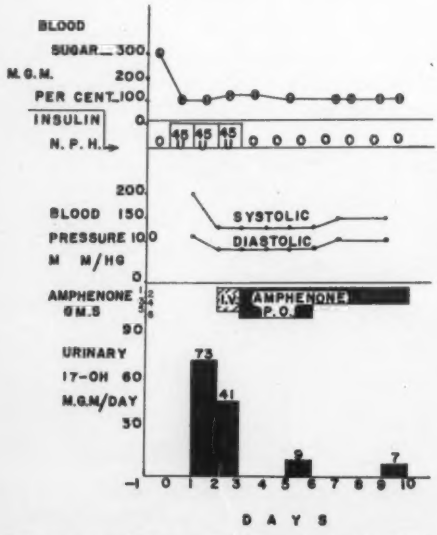


FIG. 7a. Reduction of urinary corticoid, blood pressure, and insulin requirement during oral Amphenone therapy. (Same case as Fig. 7.)

TABLE 1

TOXIC MANIFESTATIONS IN 24 PATIENTS GIVEN *Amphenone* FOUR DAYS OR MORE

Drowsiness	18
Gastrointestinal symptoms (heartburn, nausea, vomiting)	11
Rash	6
Methemoglobinemia	6
Impaired liver function	2

Amphenone as listed in table 1 are of such frequency and magnitude that the practical usefulness of this agent is seriously limited to short-term observations of more theoretical than clinical value. However, it may be realistically expected that less toxic analogues will prove of more practical therapeutic usefulness.

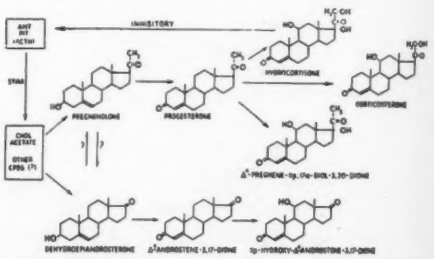


FIG. 8. Scheme for biosynthesis of adrenal steroids as proposed by Dorfman.

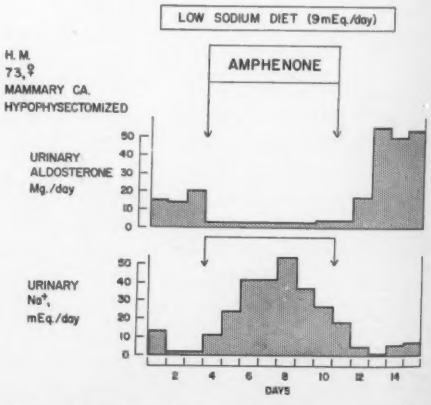


FIG. 9. Suppression of aldosterone excretion during oral Amphenone administration; note rebound upon stopping Amphenone.

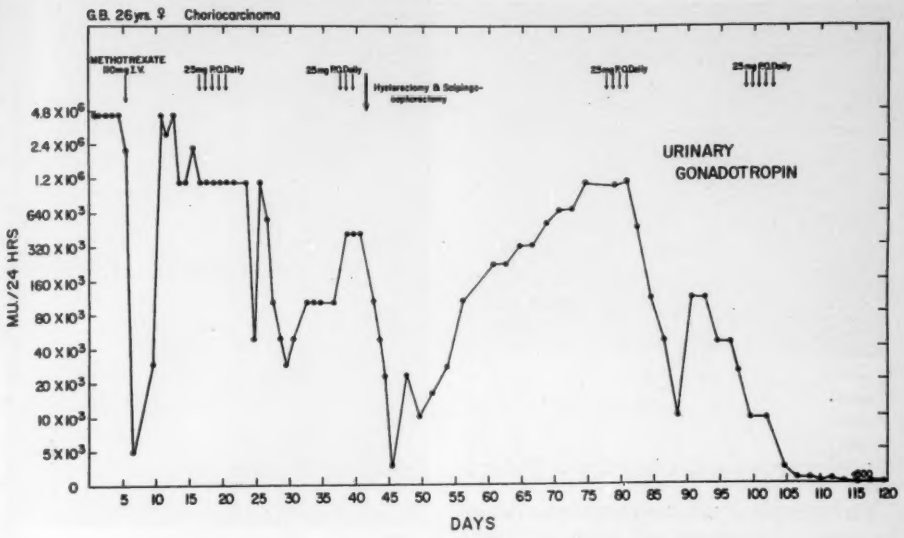
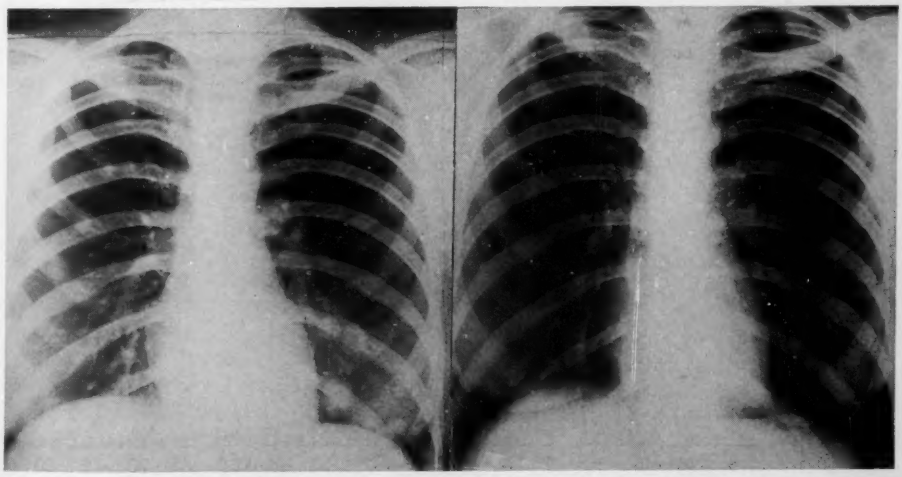


FIG. 10. Effect of intensive methotrexate therapy on urinary gonadotropin.

CHORIOCARCINOMA

Turning now to another hormone-producing tumor we wish to consider choriocarcinoma of the uterus and of the testis. The output of chorionic gonadotropic hormone in the urine of patients suffering from such tumors usually reflects the degree of functional activity of these tumors. This hormone may be measured in properly prepared concentrates of the patient's urine by biological assay in the sexually immature mouse. This assay depends upon the activation of the ovaries of the immature mouse to produce enough estrogen to enlarge the mouse's



March 19, 1956 July 5, 1956

FIG. 11. Regression of pulmonary metastases. Methotrexate therapy was initiated on March 12, 1956.

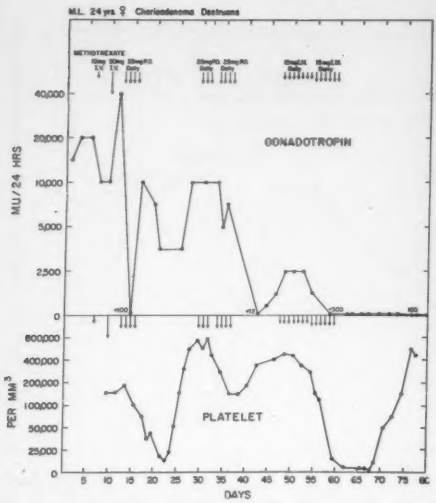


FIG. 12. Effect of intensive methotrexate therapy on urinary gonadotropin and circulating platelet count.

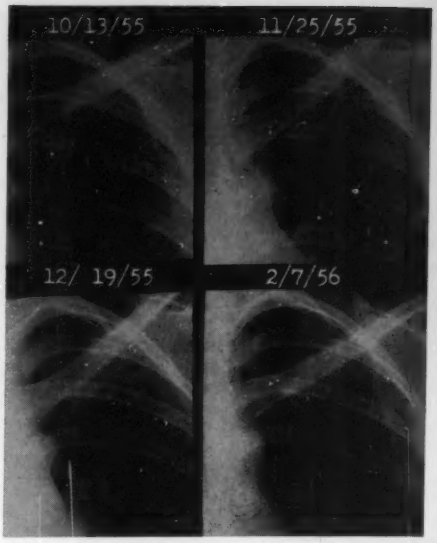


FIG. 13. Regression of pulmonary metastases. Methotrexate therapy was initiated on October 20, 1955.

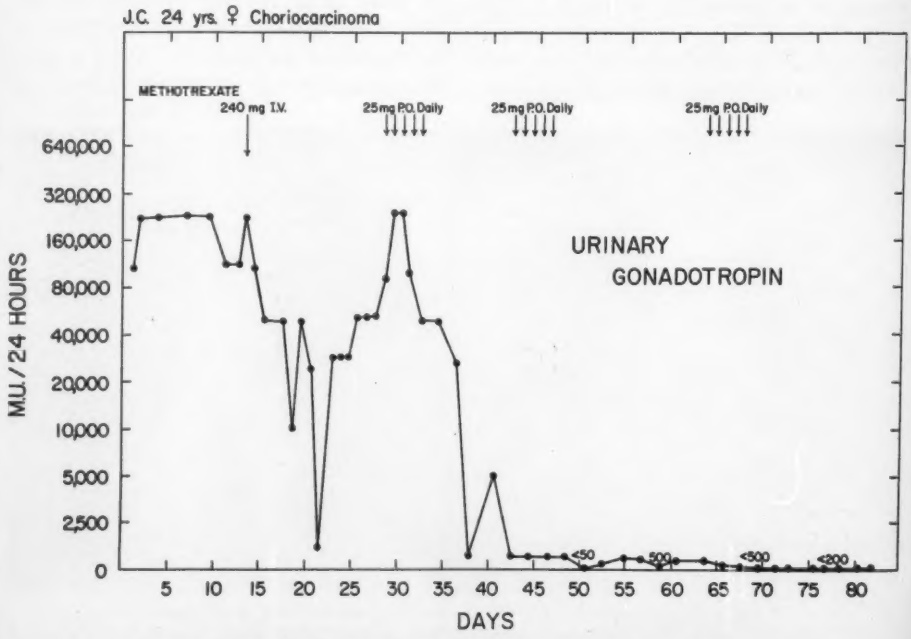
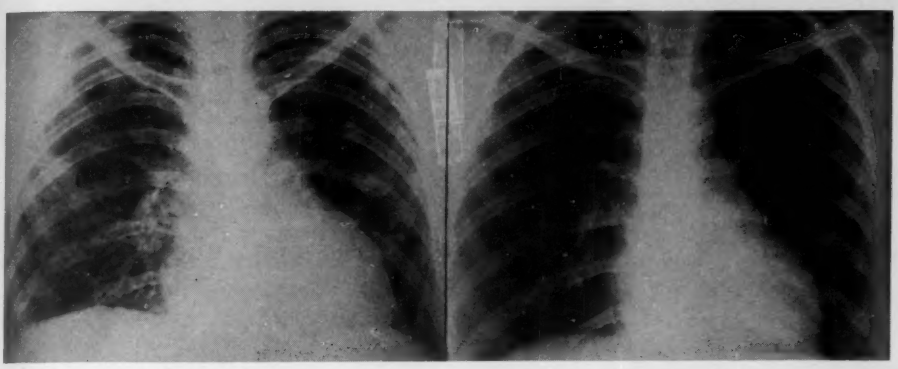


FIG. 14. Effect of intensive methotrexate therapy on urinary gonadotropin.



April 23, 1956 July 2, 1956

FIG. 15. Regression of pulmonary metastases. Methotrexate therapy was initiated on April 21, 1956.

uterus. Hence, these titres are reported in mouse uterine units. Thus we are provided with a numerical index of the functional state of the patient's tumor.

We had observed in monkeys that folic acid is essential for endometrial proliferation in response to estrogen and that such tissue growth could be blocked by the administration of such potent folic acid antagonists as methotrexate and aminopterin.[4] These studies led Thiersch[5] to use aminopterin to bring about therapeutic abortion in women. This naturally suggested the potential usefulness of folic antagonists in the suppression of tumors of trophoblastic origin.[6] Our limited studies in this area permit us to conclude that intensive anti-folic therapy with repeated courses of methotrexate leads to marked suppression of urinary gonadotropin titre accompanied by clinical and radiological improvement (Figs. 10, 11, 12, 13, 14, and 15).

These data indicate unequivocally that the hormonal output of such tumors of trophoblastic origin is susceptible to interference by appropriately intensive methotrexate therapy. Although our experience to date leads us to be encouraged as to the clinical value of such therapy we are fully aware of the great variability in the clinical behavior of these tumors and would reserve our final appraisal of the therapeutic value of anti-folic therapy in choriocarcinoma until we can increase our experience in this area.

SUMMARY

Laboratory and clinical studies of the effect of Amphenone in suppressing the hormonal output of the normal adrenal and of tumors arising in the adrenal have been described. The toxicity of Amphenone is such as to limit its clinical usefulness, but it is hoped that less toxic derivatives may provide a more practically useful agent for the suppression of adreno-cortical functions.

The rationale for the use of anti-folic therapy in the treatment of trophoblastic tumors arising in the uterus and in the testis is outlined. Initial observations on the suppression of the high urinary gonadotropin titres associated with favorable clinical and radiological effects in patients with such tumors following intensive methotrexate therapy are described.

REFERENCES

[1] Hertz, R., Tullner, W. W., Schricker, J. A., Dhyse, F. G., and Hallman, L. F.: Studies on Amphenone and Related Compounds. Recent Progress in Hormone Research, vol. XI, pp. 119-147, Academic Press Inc., New York, 1955.

[3] Tullner, W. W., Graff, M. M., and Hertz, R.: Amphenone inhibition of adrenal corticosteroid output in the hypophysectomized dog. Endocrinology 58:802-807, 1956.

[2] Hertz, R. et al.: Pharmacological alteration of

adrenalcortical function in man: Amphenone and related compounds. Amer. Assoc. of Physicians 69: 239-254, 1956.

[4] Hertz, R.: Effect of B Vitamins on the Endocrinological Aspects of Reproduction, vol. IV, pp. 135-146. Academic Press Inc., New York, 1946.

[5] Thiersch, J. B. and Phillips, F. S.: Effect of 4-amino-pteroyglutamic acid (aminopterin) on early pregnancy. Proc. Soc. Exper. Biol. & Med. 74: 204-208, 1950.

[6] Li, M. C., Hertz, R., and Spencer, D. B.: Effect of methotrexate therapy upon choriocarcinoma and chorioadenoma. Proc. Soc. Exper. Biol. & Med. 93: 361-366, 1956.

"Whoever is to acquire a competent knowledge of medicine, ought to be possessed of the following advantages: a natural disposition; instruction; a favorable position for the study; early tuition; love of labor; leisure. First of all, a natural talent is required; for, when Nature opposes, everything else is in vain; but when Nature leads the way to what is most excellent, instruction in the art takes place, which the student must try to appropriate to help himself by reflection, becoming an early pupil in a place well adapted for instruction. He must also bring to the task a love of labor and perseverance, so that the instruction taking root may bring forth proper and abundant fruits."

From *The Genuine Works of Hippocrates,*
translated by FRANCIS ADAMS

Future Trends in Military Aviation Medicine*

By

CAPTAIN ASHTON GRAYBIEL, MC, *U. S. Navy*†

(With one illustration)

THE type of craft flown and the nature of the mission have determined the trend of military aviation medicine in the past and, it is reasonable to believe, will do so in the future. Consequently, the attempt to visualize the future of military aviation medicine must be based on developmental trends in aerial warfare and how they may affect the pilot's task, the environmental stresses to which he may be subjected, and the hazards to which he may be exposed.

That many of the problems now before us were not anticipated in the early days of aviation medicine emphasizes the difficulty of anticipating what lies ahead. Nevertheless, any planning for the future necessitates such forecasting, and the better the predictions the greater the saving in lives and equipment and the greater the efficiency of the war machine. The discussion which follows must necessarily be brief; left unmentioned are the many aspects of aviation medicine which, regardless of the direction of developments in the future, will always be with us.

MANNED VERSUS UNMANNED VEHICLES

A point of departure in considering the trend in aerial warfare concerns the extent to which manned and unmanned vehicles will be used. Prior to World War II this question did not receive very serious consideration. Since that time the absolute advances in technology and the rate of development suggest that missiles will soon replace manned vehicles in several categories of air warfare. Just as the bomber took over much of the role of the artillery in World War II so the missile will eventually take over the role of the bomber. Several elements are combining to make this feat possible. It is freely predicted that in the near future rocket propulsion will be capable of sufficient thrust to send a missile 5,000 miles in a matter of minutes. The widespread damage caused by the most destructive war head reduces the need for pin-point accuracy, and it is reasonable to predict that guidance systems of different types will be successful. Man cannot accompany such a vehicle nor can he accompany vehicles which could directly intercept them.

Whole "families" of missiles are under development which will have a profound influence on the use of manned vehicles in strategic and tactical warfare. In addition to missiles designated to replace short, medium, and long range bombers others are designed as antiaircraft weapons. Thus, the appearance of a new missile may interdict the use of manned aircraft, requiring the substitution of a drone or of another missile. This does not mean the combat pilot will disappear. The reason to send him aloft will center around human abilities for which there is no substitute. The ability of man to assimilate new information, to form an opinion based on reason, and to initiate a change in otherwise specified events forms the basis for this principal task. One may envision changing circumstances in the equation of war dictating sudden shifts in the use of manned and unmanned vehicles.

It would appear that in future aerial warfare the pilot will have two natural vantage points, namely, near the ground and at very high altitude. Aircraft flying only 100 feet

---

Opinions or conclusions contained in this article are those of the author. They are not to be construed as necessarily reflecting the view or endorsement of the Navy Department.

* Presented at the 63rd Annual Convention of the Association of Military Surgeons of the United States held at Hotel Statler, Washington, D.C., November 12-14, 1956.

† Director of Research, U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Florida.

above the terrain are difficult to detect in time to take effective counter measures. However, flight at these low levels presents important problems. One is concerned with the fact that the pilot must be alert and at peak efficiency every moment of the time aloft. Another problem concerns the deleterious effects of vibration and jolting at these low altitudes. The product of these stresses multiplied by the time factor tends to produce severe fatigue. At what point loss of efficiency jeopardizes success is in itself a problem not easily solved.

From the standpoint of offense and defense the critical vantage points are at extremely high altitudes; altitudes which, for many practical considerations,[1] are above the earth's atmosphere. There is one way only in which to get there, namely, by means of a rocket type craft. There are two means only of remaining there for any extended period of time, namely, in a space ship or on a satellite platform. That man will one day get there and another day remain there is all but a certainty. Herein lie many of the crucial problems of aviation medicine of the future.

The transition from an air-breathing jet to a manned space ship poses problems, the solutions of which are not all in sight. A basic difficulty rests in the fact that a space ship must also be an airship unless it is to load and unload outside our atmosphere. The transition will probably come from present day planes and missiles. The perfection of propulsion and guidance systems in missiles will certainly find application, but the "natural" development of the missile will not soon lead in the direction of a manned vehicle. The perfection of a rocket plane, possibly with auxiliary jet propulsion of some type, looms as the "intermediate" vehicle which will carry man beyond our atmosphere for short periods. This type of craft with speeds between 2,000 and 5,000 miles an hour will present the problems which we will now briefly consider.

Environmental Stresses and Hazards

Environmental stresses and hazards incidental to travel in rocket planes are chiefly the result of high altitude, high speed, and acceleration.[2,3]

High Altitude. As man ascends to the outer reaches of the earth's atmosphere the problem of providing him with an artificial environment becomes increasingly difficult, and failure of this artifice poses an ever increasing danger. Moreover, man is exposed also to meteorological hazards as he leaves the protective shield of the earth's atmosphere. The altitudes at which some of these difficulties and hazards appear are shown in Figure 1.

The combination of cabin pressurization by means of air compressors and oxygen for breathing purposes is now utilized in nearly all flights at very high altitudes. However, the use of compressors at altitudes above 60,000 feet presents difficulties. The energy cost in compressing atmospheric air becomes very great, and at 80,000 feet will become nearly prohibitive. Moreover, the heat generated by the compression of the air will necessitate a cooling unit which will add greatly to the energy cost. In addition, the amount of ozone in the air must be taken into account and there may be a requirement for special filters or other means of reducing this hazard. The ceiling for compressors will depend on the various factors in the "balance of costs" but it is unlikely that, even as a measure of expediency, it will be much above 80,000 feet.

In order to fly higher there are two alternatives, namely, the individual pressure suit or the sealed capsule or cabin. The pressure suit imposes a great handicap on the wearer while the sealed cabin introduces the very great problems of structural integrity and a self-contained artificial atmosphere.[4,5] Furnishing the necessary oxygen, removing the CO_2, controlling humidity, making provision for waste materials, avoiding toxic gas, and controlling offensive odors all combine to make the sealed cabin a major undertaking both from an engineering and physiological standpoint. However, for short periods none of these difficulties is insuperable.

CERTAIN HAZARDS AT HIGH ALTITUDES AND LIMITATIONS IN PROTECTIVE EQUIPMENT

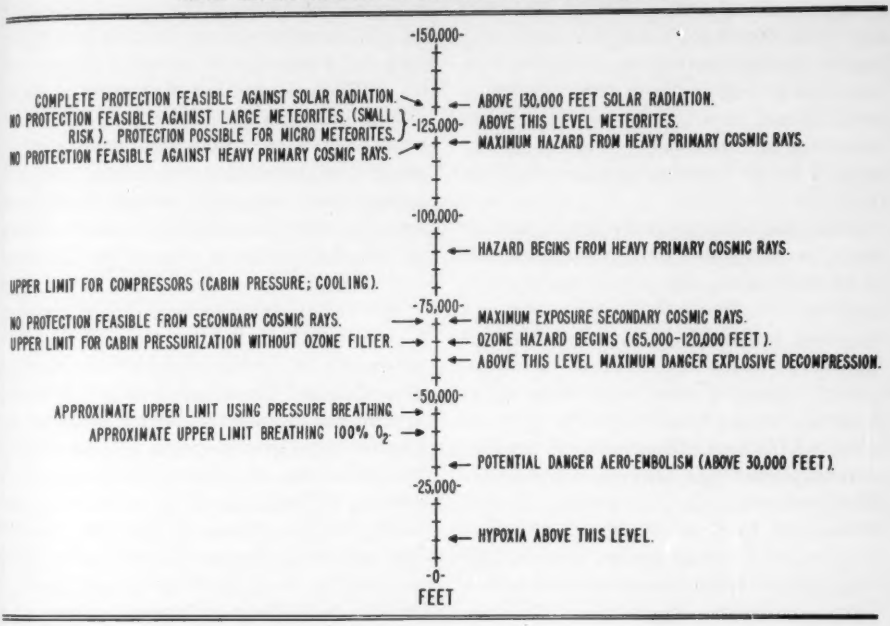

-150,000-
COMPLETE PROTECTION FEASIBLE AGAINST SOLAR RADIATION.
ABOVE 130,000 FEET SOLAR RADIATION.
NO PROTECTION FEASIBLE AGAINST LARGE METEORITES. (SMALL RISK). PROTECTION POSSIBLE FOR MICRO METEORITES.
-125,000-
ABOVE THIS LEVEL METEORITES.
NO PROTECTION FEASIBLE AGAINST HEAVY PRIMARY COSMIC RAYS.
MAXIMUM HAZARD FROM HEAVY PRIMARY COSMIC RAYS.
-100,000-
HAZARD BEGINS FROM HEAVY PRIMARY COSMIC RAYS.
UPPER LIMIT FOR COMPRESSORS (CABIN PRESSURE; COOLING).
-75,000-
NO PROTECTION FEASIBLE FROM SECONDARY COSMIC RAYS.
MAXIMUM EXPOSURE SECONDARY COSMIC RAYS.
UPPER LIMIT FOR CABIN PRESSURIZATION WITHOUT OZONE FILTER.
OZONE HAZARD BEGINS (65,000-120,000 FEET).
ABOVE THIS LEVEL MAXIMUM DANGER EXPLOSIVE DECOMPRESSION.
-50,000-
APPROXIMATE UPPER LIMIT USING PRESSURE BREATHING
APPROXIMATE UPPER LIMIT BREATHING 100% O_2
POTENTIAL DANGER AERO-EMBOLISM (ABOVE 30,000 FEET).
-25,000-
HYPOXIA ABOVE THIS LEVEL.
-0-
FEET

FIG. 1

As one leaves the protective covering of the earth's atmosphere he is exposed to cold, solar electromagnetic radiations, cosmic radiation, and to the hazard of meteorites. Cold is not a serious problem. The solar radiations including infra-red, ultraviolet, x-rays, and possibly others, do not appear to present a hazard to anyone in a sealed cabin, but our knowledge of these radiations is incomplete.

With regard to cosmic rays both the "heavy primaries" and the secondary rays require our consideration. The former are atomic nuclei, heavier than those of hydrogen (protons) and helium (alpha particles) which have great energy. The hazard is not due to the total flux, which is small, but to the great penetrating power of individual particles.[6, 7, 8, 9] At altitudes above 120,000 feet a flyer would receive about 300 to 500 hits an hour, each resulting in an ionization track with the destruction of hundreds or of a few thousand cells. This will not preclude travel beyond our atmosphere but the hazard must be taken into account and there may be specific contraindications.

As the heavy primaries approach the earth they collide with the nuclei of atoms in our atmosphere transforming these into radioactive end products, themselves being transformed into secondary rays and eventually into lesser products of decay. The maximal flux is greatest near the magnetic poles and least near the equator. If one were to remain continuously at 70,000 feet in the temperate zone, this shower would account for about one-third of the permissible doses or radiation. At sea level the effect is reduced to about 0.2 per cent, the protective value of the atmosphere being equivalent to a lead shield one meter thick.

Meteorites, at one time believed to represent an almost insuperable danger to travel in outer space, are now regarded as a minor

hazard.[9] Tiny meteorites the size of dust particles, although relatively numerous, would be destroyed on passing through the outer skin of a sky ship; meteorites sufficiently large to damage the hull are extremely rare. Inasmuch as they are, with very rare exceptions, burned to a gaseous residue on encountering our atmosphere, they do not represent a danger below an altitude of 120,000 feet.

Many additional problems are related directly or indirectly to high altitudes. The problem of escape and survival becomes extremely difficult.[10,11,12] Pilots report that they feel remote from the earth, and the "break-off phenomenon" has been described.[13] Space myopia refers to an accommodative myopia when regarding an empty visual field in which there is no cue on which accommodation and convergence can act.[14] Moreover, when there is nothing on which the eye can focus outside the cockpit, there is a natural tendency for the eye to "lock" on any object in the immediate environment.

As one ascends into the atmosphere there is a progressive decrease in light dispersion as the density of the air decreases.[15] The sky gradually darkens but objects illuminated by the sun are preternaturally bright. At a critical level depending on atmospheric conditions, the apparent source of light is no longer the sun but the atmosphere below, which creates a problem in cabin illumination. Strongly contrasting light and shadow effects at very high altitude affect retinal adaptation and create problems in visual perception.

High Speed. Travel in rocket craft must be carried out necessarily at high velocities, which introduces some of the most difficult and urgent problems of the near future. Some of these problems are dependent on the relations expressed in the well known formula $v = td$. Thus for a given distance (d) the time (t) becomes smaller with increasing velocity (v). At critical speeds the "closing time" of two approaching aircraft just equals the pilot's "reaction time," and collision would result before evasive action could be taken. The problem is exemplified beautifully by the story told recently of a pilot who flew through a formation of planes, colliding with the tail assembly of one. Not only did the pilot fail to see the formation of planes on his collision course but also none of those in the formation saw him. Under these circumstances it is obvious that man's natural powers of perception, cognition, and response were inadequate. Artificial aids are essential either to extend his natural powers or indeed to take over some of the functions now under human control.

Another problem encountered in travel at high speed is a consequence of the heat generated by friction between the surface of a ship and the atmosphere.[16,17] It would appear that the answer is to fly at high altitudes where the air is thin and the friction less. However, the stalling speed of aircraft goes up at high altitude, being in the neighborhood of 2.2 Mach at 100,000 feet. Haber[18] has calculated that at 200,000 feet a plane at present wing loadings would have to travel at 10 Mach to remain airborne, yet above 5 Mach it would burn. Although this problem is clearly in the field of aeronautical engineering, yet information is needed on human tolerance and efficiency in warm or hot environments. To add to the difficulty cabin air-conditioning at high altitude is a particularly vexatious problem.

Accelerations. Changes in speed and changes in direction of flight at constant speed give rise to linear accelerations acting in a particular direction with reference to the body. Although this is an old problem in aviation medicine, it has new features dictated by the higher accelerations associated with high speed take-offs, landings, and curvilinear flights in craft with rocket motors.

Angular accelerations, engendered by rotation of the craft about its own axis, produces effects on the flyer partly because of stimulation of the semicircular canals. This also is a familiar problem but new aspects may appear under new flight conditions. Many of the problems in pilot disorientation are closely bound up with linear and

angular accelerations and is still a fruitful field for investigation.[19]

Weightlessness. The most advantageous "flight profile" for a rocket plane in going from one point to another on the earth's surface is to thrust upward, then coast. For a brief period it will follow a parabolic trajectory during which it behaves as a freely falling body, and the occupants will be exposed to a state of zero gravity. Weightlessness results in disturbances of sensory motor function and may give rise to disorientating effects.[20, 21, 22] Investigation is made difficult by the fact that such a state cannot be reproduced in the laboratory. The results of experiments carried out aloft, though incomplete, suggest that a state of zero-gravity is tolerated fairly well for the short period to which flyers have been exposed. However, our information is far from complete; weightlessness represents one of the most immediate problems demanding investigation.

Comment. This brief review of environmental stresses and hazards incidental to flight in rocket craft at high altitudes forces the conclusion that aeronautical engineers and aeromedical scientists must collaborate in the solution of problems involved therein. The task would be simplified greatly if we were to await the development of an ideal craft prior to its operational use. However, the premium placed on being "first" or "ahead" where the military is concerned dictates the use of aircraft well in advance of its use for civilian purposes. This poses a sort of compromise solution in which human frailty is balanced against physical factors.

The Pilot's Task

Not only must the pilot survive the stresses and hazards of flight which are qualifications of a negative sort but also he must take his proper share of the responsibility for guidance of the craft he is flying and for the accomplishment of the mission on which he is sent. Wherein will these responsibilities differ in the future from those with which he is charged today?

Among the aviator's duties as a pilot we must envision the guidance of aircraft with rocket motors at speeds from 2,000 to 4,000 miles an hour at altitudes in excess of 100,000 feet. Under these circumstances certain human insufficiencies must be overcome if the aviator is to retain his role as "pilot." Accommodational aids must be furnished either to extend his powers or to relieve him of present responsibilities.[23] New information must come in advance of sight;[24, 25] intricate calculations must be done by computers; navigational aids must take over much of the problem of actual guidance; and powered controls must reduce delay[26] and relieve the pilot of physical work. Much the same sort of development must occur necessarily with respect to the pilot's role in carrying out his mission. The pilot in the future will be driven into the role of monitoring electronic devices for gathering information, integrating this information, and translating the results in terms of precision responses and precise actions.

Any serious consideration of the pilot's role in the future must conclude that mental qualifications will be the limiting factors in his success. First and foremost he must possess potential intellectual abilities which will enable him to become a specialist in a profession which demands a high degree of technical skill and judgment. To this must be added temperamental qualities which, when developed, will lead him to act decisively in critical circumstances and to act with resolution in the face of danger. Also, he must have the mental stamina or strength of mind to maintain his efficiency under adverse environmental circumstances.

Aeromedical Responsibilities

A clear definition of the responsibilities of the aeromedical profession is needed.[27] Are we responsible for the success of the pilot at his task or merely for his general fitness as an individual? The limited concept emphasizes the clinical aspects of aviation medicine while the broader concept includes also the professional qualifications of the flyer. The history of aviation medicine discloses

a trend toward the broader concept, but final acceptance of it still lies in the future. Coordination with regard to the human elements in aviation is essential and the meeting ground is not in the dispensary but in the cockpit. Many different activities are concerned, and real leadership must be on the basis of a wide knowledge of many independent disciplines.

Limited Concept. There is agreement concerning the responsibility of the aeromedical services for the general physical and mental fitness of the flyer and how they are affected by the hazards and stresses of flying. The pilot of the future must be superbly fit in order to meet the demands of his task. This does not mean fitness for hard muscular work, which he will never be called upon to perform except in case of "survival," but the fitness which will best protect him from the stresses to which he will be subjected in flight; the greater the reserve the greater the decrement which may be suffered before he becomes either inefficient or unfit to perform his task. This means that more attention must be given to the pilot's way of life both during on-duty and off-duty periods. It involves such seemingly mundane matters as proper nutrition, adequate sleep, regular exercise, and hygiene. It involves also matters which might be regarded as personal, i.e., the use of alcohol and tobacco, difficulties in interpersonal relations, financial problems, family worries, and, indeed, anything which might divert his interest and attention from his task or otherwise impair his efficiency.

It is the responsibility of the aeromedical services to continue the investigation of the effects of environmental hazards on health and the effects of flying stresses on efficiency. More emphasis must be placed on evaluations involving the total situation and not simply on the effects of single stress factors. At the operational level there will be a pressing need for reliable measures of general fitness and for reliable measures of efficiency.

The Broad Concept. This includes the professional qualifications of the pilot in addition to his general fitness. There is uncertainty regarding the responsibility of the aeromedical activities toward these additional qualifications. As pointed out elsewhere the pilot needs to be a student of his profession throughout his career.[28] The habit of studying, acquired during the period of formal training, must be retained if he is to keep up with the fantastic rate of development in military aviation. This requirement can be met best through the services of professional educators. Not only must the pilot have a high degree of technical skill and judgment but he must also have the temperamental qualities which are the hallmark of the professional soldier, namely, the ability to act effectively in the presence of danger.

It is self-evident that the realization of these objectives can be accomplished only through a long process of selection and training. Young men should be brought into the training program before their interests have had an opportunity to develop in other directions. They must be carefully nurtured and embued with the realization of their important role. There should be every encouragement and no penalty for continual assignment in a specialty until their operational career, short at best, is over.

The military aeromedical services must look forward to continual technological advances in the weapons of aerial warfare. The seemingly impossible suddenly becomes a reality as the result of a "breakthrough." It would appear that man alone remains a constant in the great equation. With regard to physiological mechanisms the keynote is constancy. We speak of the constancy of internal environmental factors and this requires, within small tolerances, constancy of the immediate external environment. Yet, the advent of "flying blind" represents essentially a human breakthrough. Two steps were involved: First, the presentation of necessary information in symbolic form and, second, the learning to interpret or use the symbols. Thus, breakthroughs are possible where human ingenuity and ability to learn are concerned. Given the proper environment and adequate accommodational aids and facilities,

man can pilot any type of craft now envisioned. In exploiting man's potentialities and in coordinating the human elements in weapons systems the aeromedical services have much to offer.

References

[1] Strughold, H.: Atmospheric Space Equivalence. J. Aviat. Med., 25:420-424, 1954.

[2] White, C. S., & Benson, O. O., Jr.: Physics and Medicine of the Upper Atmosphere. A Study of the Aeropause. Albuquerque: The University of New Mexico Press, 1952.

[3] Haber, H.: The Physical Environment of the Flyer. Randolph Field, Texas: Air University, USAF School of Aviation Medicine, 1954.

[4] Strughold, H.: The U. S. Air Force Experimental Sealed Cabin. J. Aviat. Med., 27:50-52, 1956.

[5] Fenno, R. M.: Man's Milieu in Space. A Summary of the Physiologic Requirements of Man in a Sealed Cabin. J. Aviat. Med., 25:612-622, 1954.

[6] Schaefer, H. J.: Exposure Hazards from Cosmic Radiation Beyond the Stratosphere and in Free Space. J. Aviat. Med., 23:334-344, 401, 1952.

[7] Schaefer, H. J.: Theory of Protection of Man in the Region of the Primary Cosmic Radiation. J. Aviat. Med., 25:338-350, 1954.

[8] Chase, H. B.: Cutaneous Effects of Primary Cosmic Radiation. J. Aviat. Med., 25:388-391, 427, 1954.

[9] Schaefer, H. J.: Definition of a Permissible Dose for Primary Cosmic Radiation. J. Aviat. Med., 25:392-398, 411, 1954.

[10] Christy, R. L.: The Navy Program for Aircraft Escape. J. Aviat. Med., 22:408-413, 1951.

[11] Stapp, J. P.: Effects of Mechanical Force on Living Tissues. 1. Abrupt Deceleration and Windblast. J. Aviat. Med., 26:268-288, 1955.

[12] Sperry, E. G., Nielsen, H. P., & Barash, I. M.: Downward Ejections at High Speeds and High Altitudes. J. Aviat. Med., 26:356-372, 1955.

[13] Clark, B., & Graybiel, A.: The Break-Off Phenomenon: A Feeling of Separation from the Earth Experienced by Pilots at High Altitude. Project NM 001 110 100. Report No. 43, Pensacola, Fla.: Naval School of Aviation Medicine, 1956.

[14] Whiteside, T. C. D., & Campbell, F. W.: Accommodation of the Human Eye in an Empty Visual Field. Report No. 821. Great Britain: Flying Personnel Research Committee, Royal Air Force, 1953.

[15] Dose, R. G., & Dickinson, T. G.: Visibility of Cockpit Instruments at High Altitude. J. Aviat. Med., 25:260-264, 288, 1954.

[16] Lindes, D.: Requirements for Protection Against Thermal Hazards of High Speed Flight. J. Aviat. Med., 22:358-364, 426, 1951.

[17] Blockley, W. V., McCutchan, J. W., Lyman, J., & Taylor, C. L.: Human Tolerance for High Temperature Aircraft Environments. J. Aviat. Med., 25:515-522, 1954.

[18] Haber, H.: Man and Machine Between Atmosphere and Space. Aeronaut. Eng. Rev., 13:56, 1954.

[19] Clark, B., & Graybiel, A.: Disorientation: A Cause of Pilot Error. Riv. Med. Aeron., 18:219-250, 583-641, 1955.

[20] Gerathewohl, S. J.: Physics and Psychophysics of Weightlessness Visual Perception. J. Aviat. Med., 23:373-395, 1952.

[21] Henry, J. P., Ballinger, E. R., Maher, P. J., & Simons, D. G.: Animal Studies of the Subgravity State During Rocket Flight. J. Aviat. Med., 23:421-432, 1952.

[22] von Beckh, H. J. A.: Experiments with Animals and Human Subjects Under Sub- and Zero-Gravity Conditions During the Dive and Parobolic Flight. J. Aviat. Med., 25:235-241, 1954.

[23] Hoover, G. W.: A Methodology for Instrument Display Design. In AGARDograph No. 5, Anthropometry and Human Engineering. London: Butterworths Scientific Publications, 1955.

[24] Mayo, A. M.: Some Influences of Aero Medical Data on Aircraft Design. J. Aviat. Med., 25:667-670, 1954.

[25] Mayo, A. M.: Improvements for Pilot Can Increase Aircraft Efficiency. J. Aviat. Med., 27:23-26, 1956.

[26] Taylor, F. V., & Birmingham, H. P.: Simplifying the Pilot's Task Through Display Quickening. J. Aviat. Med., 27:27-31, 1956.

[27] Graybiel, A.: The Concept of Aviation Medicine. J. Aviat. Med., 25:504-514, 522, 1954.

[28] Graybiel, A.: Problems Involving the Pilot and His Task: The Changing Emphasis in Aviation Medicine. J. Aviat. Med. In Press.

Surgical Uses of Saran (Vinylidene Chloride Vinyl Chloride) Co-Polymer Staple Fiber— A Preliminary Report

By

IRVING MAUER, M.D.*

(With one illustration)

FOR some time the need for a non-wettable resilient packing and pressure material has been felt. We have been experimenting with a special saran staple fiber, and find that it conforms to our needs in many respects.

The staple fiber as it reaches us is similar to the material which is used commercially in the manufacture of dolls' hair, except that the color has been omitted. It is a bulky, kinky collection of fibers all of the same length. It may be sterilized by autoclaving or by soaking.

One of the outstanding properties of this fiber is its nonwettability. Saran absorbs less than 0.1% of moisture.

We have found that when this material is used as a pressure packing against skin grafts or after excision of Dupuytren's contracture, it maintains its pressure against the graft. Bleeding, if any, seems to be drawn up by the fibers by capillary action to be absorbed on the outer dressing. Thus, the pressure which was initially applied is maintained. Mechanic's waste when used in this way rapidly becomes wet and mats producing a plaster cast or concrete-like effect against the wound. When the saran fiber is used instead of mechanic's waste there is no matting and it is possible to change the blood or serum soaked outer dressings without disturbing the wound.

As an extension of this non-wetting property we have in several cases used the sterile material as a wound packing material.

FIG. 1. Saran

In contaminated wounds which formerly were packed daily with gauze we have substituted initial packings with the sterile saran fiber. We have found that wounds healed

TABLE I

MOISTURE REGAIN OF TEXTILE FIBERS

Material	*Percent*
Acetate	6.0
Acrilan	1.2 – 1.6
Cuprammonium rayon	12.0 –27.0
Cotton (raw)	7.0
Dacron	0.5
Dynel	0.4 – 0.5
Fortisan	10.0 –11.0
Glass	0 – 0.3
Nylon	4.0 – 8.0
Orlon	2.0 – 4.0
Poly-ethylene	1.0 – 0.01
Saran	0.1
Vicara	0.10
Viscose rayon	10.0 –11.0
Wool raw	3.0
Cornish wool	13.0 –15.0

* Ass't Chief of Surgery in Charge of Orthopedics, U. S. Public Health Service Hospital, Staten Island 4, New York. Material for this study was furnished through courtesy of Saran Yarns Corp., Odonton, Md.

with satisfactory granulations slightly more rapidly. It was felt that this took place since the depths of the wound could be satisfactorily irrigated with saline or an antibiotic solution passing easily through the interstices of the saran packing. Granulations were not greatly disturbed by daily removal or re-packing. We found that as healthy granulations piled up the saran packing was very gradually extruded from the wound. On several occasions we have preceded the saran packing with a fenestrated polyethylene catheter in the depths of the wound through which an irrigating solution was introduced. If the wound was large enough, ordinary irrigation through the saran quite easily reached the depths of the wound.

Other uses are as a dressing over wounds leaking urine. A dressing of saran will allow the urine to leak through to be absorbed on the outer dressings with minimal wetting or maceration of skin. This has been used by the Urology Department on several cases following suprapubic cystotomy with encouraging results. No skin irritation has been noted in our series, nor has there been difficulty with removal of all of the material buried in a wound.

Further studies are being carried out to assess subcutaneous and intramuscular implantation of the fiber, as well as its use in modified form in blood vessel grafts, and in the closed treatment of burns.

References

American Textile Reporter—July 19, 1956.

L. Mauer and H. Wechsler—Man Made Fibers. Rayon Publ. Corp. 1953.

OUR 64TH ANNUAL CONVENTION—October 28, 29, 30, 1957

Theme: Professional Excellence—The Criterion of Military Medicine

Chairmen appointed are:

General Chairman

Maj. Gen Paul I. Robinson, MC, USA
Office of the Surgeon General
Department of the Army
Washington 25, D.C.

Chairman, Scientific Exhibits

Capt. William M. Silliphant, MC, USN
Armed Forces Institute of Pathology
Washington 25, D.C.

Program Chairman

Col. Robert C. Kimberly, MC, Md. NG.
802 Cathedral Street
Baltimore 1, Md.

Chairman, Ladies Committee

Mrs. Charles S. Gersoni
1408 Sheridan St., N.W.
Washington 11, D.C.

Chairman, Commercial Exhibits

Mr. Steven K. Herlitz
280 Madison Avenue
New York 16, N.Y.

Importance of Histologic Examination of Diseased Oral Tissues*

By

GEORGE W. GREEN, JR., B.S., D.D.S.†

IN THE past hundred years research in dentistry has been largely confined to the two most common oral diseases, dental caries and periodontitis. Diseases involving the oral mucous membranes, the jaws and the salivary glands have been given but minor attention.

Prevention or control of dental caries has been accomplished by nutritional studies related particularly to carbohydrate intake and investigation of the ammonium and fluorine ions. Fluoridation of communal water supplies has shown great promise in the control of dental caries. No method for prevention or control of periodontal disease in large groups has been discovered, but by the efforts of a competent dentist and a cooperative patient periodontal disease in the individual case can be controlled.

It is only natural that in preventive dentistry emphasis has been placed on the two dental diseases that are most prevalent, especially since failure to recognize and control either of them may result in the loss of a tooth or teeth. Early diagnosis and treatment of lesions of oral mucous membrane, salivary glands and the jaws call for even greater vigilance and more thorough examination because of the possibility of neoplastic disease. Microscopic study of all suspicious lesions is the principal means by which correct diagnoses can be established.

It is the purpose of this paper to emphasize the importance of histologic examination of diseased oral tissues, particularly as it relates to neoplastic disease. Failure to recognize and control malignant oral disease has the most serious of consequences in that it often results in the death of the patient.

Only in relatively recent years have diseased oral tissues been studied histologically. This method of investigation, even in the short time it has been recognized as an adjunct to the planning of treatment has added to our knowledge of oral disease processes. Since the use of this diagnostic procedure has increased a hundredfold in the past fifteen years, it may be said that the outlook for its widespread adoption is favorable.

Today a dentist would consider it poor practice to plan the treatment of oral disease without reference to x-rays of the oral region. One has only to look back forty years to realize that the use of such aids to diagnosis and treatment was relatively rare. It is assumed that as the importance of the removal of tissue from the oral regions for histologic examination is better understood, its practice will markedly increase. It is entirely conceivable that in much less than forty years the dentist will consider it poor practice to omit histologic examination in any instance in which it might contribute to proper analysis of a case.

The biopsy procedure whereby tissue for examination is obtained is not a test for oral cancer but an informative means which will often confirm or deny one's clinical impression of the oral disease in question. However, in cases of oral malignancies this procedure is diagnostic. The two most commonly used biopsy technics in regard to oral lesions are surgical excision and surgical incision. Surgical excision means the removal of the entire lesion, which is the usual procedure in the case of small or encapsulated lesions. Surgical incision means the incision of a portion of the lesion and

* Presented at the 63rd Annual Convention of the Association of Military Surgeons, Washington, D.C., Nov. 12-14, 1956.

† Veterans Administration Central Laboratory for Anatomical Pathology and Research, Armed Forces Institute of Pathology, Washington, D.C.

is the method of choice for large lesions. In such a procedure incision in the region of the periosteum or large blood vessels should be avoided. In the majority of instances biopsy procedures traumatize the oral tissues no more than a routine surgical extraction.

When submitting the tissue to the pathologist it should be accompanied by an accurate and complete clinical history including reports on all laboratory tests and the x-rays, if indicated. The tissue submitted should be representative and the location of the lesion should be described in detail.

The clinician should realize that the value of the pathologist's report will be proportional to the care exercised in obtaining and fixing the specimen. He should be aware of some of the more obvious ways that the tissue can be distorted, namely: use of cautery, drying out of tissue before fixation, injection of local anesthetic in the immediate area and crushing the tissue by using serrated forceps or hemostats. If the lesion is small or encapsulated it should be removed in its entirety. The tissue obtained should be fixed in 10 per cent formalin in a volume twenty times as great as that of the specimen.

Biopsy in many instances is essential for diagnosis of the disease process. Numerous studies of oral malignancies have shown that a high rate of cure is related directly to early diagnosis. The dentist has an unusual opportunity to provide early diagnosis of cases of oral cancer because of the widespread practice of periodic oral examinations at intervals of six months or a year. It is a well established fact that the symptoms and clinical course of cancer are insidious, particularly in its early stages. Early cancer of the oral mucosa is often seen as a small painless ulcer or indurated growth which infiltrates the surrounding tissue. Often the patient may be unaware of its existence. Because of these circumstances the responsibility of the dentist in such a situation is clear. His training and experience enable him to recognize any deviation from normal in the course of a thorough oral examination. Over and above the treatment of the teeth and periodontium, he has a responsibility to the patient as a person, for when he discovers a malignant oral tumor he may be instrumental in saving a life.

There are certain facts which are best illustrated by describing situations in which the biopsy procedure is essential for a definitive diagnosis. For example, a radiolucent area in the mandible not associated with the teeth may represent a metastatic tumor, a traumatic cyst, a central giant cell reparative granuloma, an eosinophilic granuloma, an ameloblastoma or a number of other lesions producing a similar x-ray change. Such a lesion can be accurately diagnosed and therefore appropriately treated only by examining the tissue histologically.

A radiolucent area in the upper anterior maxillary region may indicate a dental granuloma or radicular cyst, a fissural cyst, an ameloblastoma, a central giant cell reparative granuloma, a cementoma or many other conditions producing similar changes. The diagnosis cannot be definitive until examination of tissue from the area reveals the nature of the process.

An ulcer on the oral mucosa may represent a traumatic injury, an allergic response, a manifestation of a systemic disease, i.e., syphilis, tuberculosis, histoplasmosis, or a chemical burn and possibly a neoplastic process. Clinical information may reduce the etiologic possibilities to be considered, but if the ulcer is in any way chronic or progressive, biopsy is indicated.

A white patch on oral mucous membrane may result from a simple hyperplastic or hypertrophic reaction, lichen planus, syphilis, moniliasis, leukoplakia or carcinoma. However, to differentiate between these and other similar clinical lesions is virtually impossible other than by histologic examination.

Finally let us consider vesicular lesions on the oral mucosa. They may represent a herpetic infection, a form of erythema multiforme, a sensitivity reaction, or a form of pemphigus. The clinical information together with the histologic examination may

give a definitive diagnosis, but even with all available information the diagnosis may be compatible but not conclusive.

These are only a few of the oral diseases or oral manifestations of systemic disease that confront the dentist, but they are sufficient to illustrate the need for and value of the biopsy procedure.

It is because of this that increasing emphasis is being laid on oral pathology and that students in schools of dentistry are being urged to specialize in that field. A thorough knowledge of oral pathology on a firm basis of clinical experience is most advantageous, and the man with such training can make significant contributions to preventive dentistry.

The most serious problem that confronts the dentist is oral malignancy. The number of such cases is admittedly small in comparison with caries or periodontal disease. However, preventive dentistry in addition to its role in the control of caries and periodontal disease must have increasing concern for detection and possible control of oral diseases of the mucous membranes, the jaws and the salivary glands, and particularly for those of a neoplastic nature. The public health benefits to be derived from the functioning of the dental profession as an oral cancer detection service in addition to its other services for oral health would be immeasurable.

References

Muhler, J. C., Hine, M. K., Day, H. G.: Preventive Dentistry. St. Louis, 1954. The C. V. Mosby Company, p. 307-312.

Bernier, J. L. and Tiecke, R. W.: The biopsy. J. Oral Surg. 8:342, 1950.

Tiecke, R. W., and Bernier, J. L.: A morphological and statistical analysis of 401 intra-oral carcinomas. J.A.D.A. 49:684, 1954.

Bernier, J. L.: The Management of Oral Disease. St. Louis, 1955, The C. V. Mosby Company

"We seek peace, knowing that peace is the climate of freedom. And now, as in no other age, we seek it because we have been warned, by the power of modern weapons, that peace may be the only climate possible for human life itself."

President Dwight D. Eisenhower
Second Inaugural Address

Principles and Methods in Teaching the Citizen Soldier

By

Second Lieutenant Charles A. Bryan, MSC

Florida National Guard, Florida State University, Tallahassee, Fla.

With the Congressional order in effect regarding reserve training of enlisted personnel, active reserve units will be springing up all over the country. With required two hours drill per week, much of this time will be devoted to teaching the practice and theory of numerous necessary military subjects.

It is necessary, therefore, that we become highly proficient as instructors. Indeed, one might say that we are not only reserve military personnel, but also active teachers and students. Teaching, like any other science has some definite principles and methods to guide its successful execution. The success of the reserve program could easily depend on how well we utilize modern educational methods and principles.

Principles

The principles of John Dewey and the concepts of modern educational psychology are to the instructor as Newton's Laws are to the physicist. Among the most important principles of learning is the well proven concept that *interest* is the key to instruction. One finds it difficult to learn if not interested in the subject. Admittedly, it is often more than difficult to arouse interest in some military courses, but we must find some way to interest the reservist in our subject if he is to be successfully motivated to learn. By *motivation* the educator means stimulating or showing the necessity for learning the subject. Frequently we tend to neglect both interest and good motivation in military instruction.

Quite often learning occurs only after constant *repetition*. Although repeating or drill is often monotonous to the student, it is necessary to hear an important point over many times before it can be truthfully said that the student knows it.

We learn most if that which we are studying is very *close to our every day experiences*. Therefore, analogies between army life and civilian experiences help the reservist to better appreciate the military sciences.

Finally, another very valuable principle of learning is that we *"learn by doing."* This idea was first used by the ancient Hebrews and, as explained by John Dewey, simply means that, if possible, let the student do the work himself. In such courses as first-aid, map-reading, and field stripping weapons, the army applies the "learn by doing" principles; and it *must* be used wherever possible. If the citizen soldier can "see," "hear," and "do," he is most likely to learn.

Methods

Methods are to the instructor as test-tubes are to the chemist. The *Lecture Method* is most commonly used in college and military instruction. It has the advantage of the instructor carefully controlling the material to be covered. He passes on his knowledge of the subject to the students; but, in so doing, the audience is passive. That is, the reservist listens and watches, but does not take an active or constructive part in the lesson. To avoid this passive learning, elementary and high school educators have developed "group discussions," which is what the United States Army calls the *Conference Method of Learning*. It is an example of student-centered teaching. In this method the student takes an active part in developing the material to be covered. The instructor asks thought-provoking questions which the students answer and discuss, and likewise, the soldier feels more free to ask questions of the instructor. Most contemporary educators have agreed that the conference method is a highly effective technique

of learning because the student takes part in the learning experience and, as a result, is more interested.

The *Demonstration Method* of learning is extremely useful to us because the student not only hears, but sees as well. The more senses involved, the better. Instructors demonstrate with models, charts, actual military equipment, or using trained men to show how something is done.

The *Coach-Pupil method* is especially fine because the student learns by doing, but it does require careful supervision.

Naturally, no one particular method can be said to be better than the other. It depends on the subject matter to be presented. Quite often all three methods are used during an hour class to effectively hold the interest of the reservist students.

Obviously, before entering a class, the instructor must know thoroughly the subject to be presented. The student must know that the instructor knows exactly what he is talking about. He must know the material to be covered thoroughly so that he expresses self-confidence. After satisfying this necessary prerequisite, the instructor should satisfy the equally important requirement of preparing a lesson plan which covers at least six aspects—aim, motivation, training aids, subject matter, method or methods, and summary.

In stating his *aim*, the instructor limits the subject to be covered and states the purpose of the class. He then lists some methods he can use to *motivate* the reservist to learn. A short film, a story or even appropriate joke, a startling statement, or questions can serve to arouse interest and thus motivate learning. On the lesson plan it is absolutely necessary to list the *training aids* which will be used to clarify and explain clearly. Aids are easily forgotten. Such materials as blackboards, chalk (both white and colored), pointers, charts, models, films, film strips, and actual GI equipment make the difference between a good lesson and a poor one. These materials are kept out of sight until used, so as not to detract the students' attention. With respect to films, educators now agree that films can be a waste of time unless introduced, discussed and summarized. Models and equipment tend to focus the students' attention and make the subject matter less abstract and more concrete.

Having listed the materials to be used, the instructor outlines the *subject matter* together with the *method* or *methods of presentation*. He can lecture for part of the period; ask questions, as in the conference method, to cover some of the material; demonstrate with materials or men; and show a film all in one class. Using more than one method often prevents students from being bored, and gives them a more complete understanding of the course.

Certainly, no lesson is complete without an adequate *summary* during which important points are stressed and repeated so that any confusion in the students' minds is crystallized.

These are some of the principles and methods of effective teaching which, when coupled with the enthusiasm of the instructors, make for the effective training of our citizen soldiers.

A Symposium on the Pathogenesis of Atherosclerosis

Conducted By

THE DEPARTMENT OF PHARMACOLOGY-BIOCHEMISTRY
SCHOOL OF AVIATION MEDICINE, USAF
RANDOLPH AIR FORCE BASE, TEXAS

Participants

DAVID SCHACHTER, Captain, USAF (MC), *Chairman*
LAWRENCE J. MILCH, Lt. Colonel, USAF
DAVID RUBINSTEIN, M.A.*
LAWRENCE E. LAMB, M.D.
WALTER H. SMARTT, Captain, USAF (MC)†
GORDON F. VAWTER, Captain, USAF (MC)
NORMAN WEINER, Captain, USAF (MC)‡
ALFRED A. RENZI, First Lieutenant, USAF (MSC)

Introduction

CAPTAIN SCHACHTER: The enormity of the problem of atherosclerosis is clear from the consideration that in 1953 the total number of deaths in the United States from just one complication of this process—atherosclerotic heart disease—was 400,000, fully one-quarter of all mortalities. To physicians currently observing the incapacities, the stunting of careers, the loss of vital, highly-trained personnel, as well as the mortalities from the disease, the critical question is: can we do something to prevent or reverse this process *now?*

Rephrased, the question asks: is enough understood of the pathogenesis of this condition to suggest remedial measures? We shall attempt to answer this question in this seminar. It may be stated at the outset that crucial, definitive, and unequivocal proof for any one hypothesis of the pathogenesis of atherosclerosis has not been reported. However, a consideration of the problem from the varying viewpoints of many disciplines leads to accumulation of circumstantial evidence which is impressive and does, indeed, suggest a simple program which might be effective in preventing or reversing the arterial disease.

Anatomical pathology is the approach which, historically and logically, has provided many of our fundamental ideas on the nature of this process. We have asked Captain Vawter to begin this seminar with a discussion of atherosclerosis as the pathologist sees and defines it.

CAPTAIN VAWTER: The term atherosclerosis implies two principal anatomic components. The *atheromatous* component—a term derived from Greek and meaning "mushy" relates to the consistency of the focal, soft, cheesy lipid accumulations occurring in relation to arterial intima. It is commonly held that these deposits are most responsible for atherosclerotic encroachment upon the arterial lumen. The second component—the *sclerotic* phase—represents a physical change or hardening of arteries. This change is seldom limited to the focal lipid deposit. There is controversy as to whether these two components of the lesion are necessarily related, or, stated another way, it is not clear that all manifestations of sclerosis bear the same relationship to the focal lipid. However, when acute clinical symptoms develop, both structural components are found within the atherosclerotic lesion. The human coronary artery may serve as an example. In a cross section of a

Present address:
* General Electric Corporation, Schenectady, New York.
† Lookout Mountain, Tennessee.
‡ Department of Pharmacology, Harvard Medical School, Boston, Mass.

human coronary artery with early involvement, the inner layer, or intima, is separated from the fibroelastic and muscular media by the internal elastic membrane, and beyond lies the fibrous and vascular adventitia. The intima is eccentrically thickened with a layer or two of foamy cells, associated with deposition of lipid. Little else may be recognized in ordinary histologic preparation.

When neutral fats are stained orange or black in such a lesion, there is intimal lipid present. Another feature is the abnormal stainability and reduplication at several points of the internal elastic membrane. At a higher power, and slightly later in the development of a lesion, the media is practically devoid of elastic tissue when appropriately stained. The reduplication, irregularity, and gross discontinuities in the internal elastic membrane, beneath the intimal plaque, are again visible. There is controversy as to the exact relationship of degenerating mural structure such as elastic tissue to the lipid and sclerotic lesions.

Now, we may turn from early atherosclerosis to severe disease of the coronary artery. This type of lesion may be associated with acute symptomatology. The media is atrophic, and macrophages containing lipid lie within it. The lesion shows practically complete absence of the internal elastic lamella, and much deep intimal lipid, overlain by sclerotic tissue. Note that blood vessels ramify in the new intimal tissue. A stain for fat confirms the distribution of lipids, the characteristics of the elastic membrane, and the presence of vascular channels.

Some comments upon the distribution of atherosclerosis within the body are worthwhile. The disease may involve any single arterial bed to the exclusion of others, or it may involve combinations of them. It is possible, for instance, to find atherosclerosis limited to the coronary circulation or to the cerebral circulation, or even to one segment of an arterial bed. This type of localized lesion sometimes accounts for coronary occlusions in young males. Other well known features of this localization include a predilection for the origin of aortic branches, selective involvement of those arterial beds subjected to systemic, but not the normal pulmonic blood pressure, and relative freedom from disease of most of the intraparenchymal beds.

Acute complications occurring within the atherosclerotic lesion most frequently bring the patient to the doctor. It should be emphasized that the mechanisms of these complications are virtually unexplored. An example of one complication is an atheromatous plaque involved by a peculiar swelling, necrosis, and hemorrhage. An early thrombus often overlies the plaque. Another type is an inflammation, or arteritis of uncertain origin. Sometimes areas of hemorrhage and luminal thrombosis are concomitants.

It is of interest to contrast the lesion of human atherosclerosis with that of a commonly induced experimental lesion in rabbits fed a high-cholesterol diet. The rabbit lesion may consist of lipid deposition in the intima of the intramyocardial part of the coronary artery. The intramyocardial location is unusual in the human disease. Further, sclerosis is seldom conspicuous in uncomplicated rabbit vascular atheromatosis. The complications occurring within the atherosclerotic lesions of humans are rare in such experimental lesions. Despite severe atheromatous luminal narrowing, myocardial infarction in rabbits seldom achieves the massive proportions of the human counterpart.

CAPTAIN SCHACHTER: Significant clues to the pathogenesis of atherosclerosis are derived from observations made by clinicians on diseased patients. Doctor Lamb will discuss certain of these.

DOCTOR LAMB: The clinician has long recognized certain signposts that alert his diagnostic acumen to the possibility of underlying atherosclerosis. These signposts are not, in themselves, diagnostic, but are important because of guilt by association.

Race is one signpost. Atherosclerosis is most common in the Jewish race, common in North Americans and Northern Europeans, and reported to be uncommon in Africans, Mongoloids, and other groups of the Asiatic world.

Another signpost is familial incidence. A high familial incidence is a warning of possible underlying atherosclerosis. It is also important to the prognosis. Individuals whose family have survived the complications of atherosclerosis will survive similar complications with greater ease.

Age is a signpost to the observing clinician. As age increases, the incidence of atherosclerosis increases. However, we have learned that youth is no sanctuary against the ravages of atherosclerosis. Atherosclerosis has been demonstrated in the first few weeks of infancy. The diagnosis of myocardial infarction in the young has been made so frequently that it has lost its place as a medical curiosity.

Sex hormones play a role in the production of atherosclerosis. Coronary artery disease is predominantly a disease of the male. Its diagnosis in the premenopausal female should be regarded with suspicion unless there is a predisposing disease, such as hypertension or diabetes. As women pass the menopausal period their incidence of atherosclerosis increases. After the age of 60 the incidence in men and women is approximately equal. This may be misleading, however, because many men who are susceptible to atherosclerosis have already died by the age of 60. Studies indicate that coronary artery disease is almost nonexistent among eunuchs. The so-called "male" male is more susceptible to coronary artery disease than the average man. Thus the presence of strong secondary sexual characteristics—prominent muscularity, receding hairline, heavy beard—is a signpost for the clinician. Another difference in the two sexes is a thickening of the intima of the coronary vessels in the male, but not in the female, at birth.

Another signpost along the road to atherosclerosis is previous inflammatory disease. Any inflammation of a vessel is capable of laying the ground for the development of atherosclerosis. The classic example is luetic aortitis.

The presence of hypertension should be noted. At one time, it was felt that hypertension was the sole cause of atherosclerosis. Many of the complications of hypertension are atherosclerotic in nature, such as myocardial infarction or angina pectoris with involvement of the vessels in the kidney, or cerebrovascular complications indicating vascular disease of the cerebral vessels. These complications occur more predominantly in the male, again, whereas the female escapes them. It is indicated then that blood pressure is not the sole factor. Moreover, we are unable to correlate directly the level of hypertension with the course of the disease.

Nature provides additional observations which point out that the level of blood pressure is an important factor in atherosclerosis. Atherosclerosis simply does not occur in the pulmonary tree (except in very rare instances) without increased pulmonary pressure. In any one individual, the only evident differences between the systemic and pulmonary circulations are the histologic ones or the levels of intra-arterial pressure. Pulmonary atherosclerosis does occur in such diseases as mitral stenosis, or congenital lesions which are associated with increased pressure in the pulmonary tree. So we can say, I think, with considerable conviction that blood pressure is important.

The last group of signposts which I would like to consider are the metabolic disorders. The clinician has long recognized several metabolic diseases with abnormal lipid metabolism that have a relationship to atherosclerosis. In general, elevated blood lipid levels are associated with more prominent atherosclerosis. One example is diabetes. Atherosclerosis and elevated blood lipids are not only common, but expected in the course of the disease.

Other diseases in the metabolic group

include long-standing biliary cirrhosis or obstructive disease of the biliary tract, certain pancreatic diseases, nephrosis, and xanthomatosis. Xanthomatosis may be either acquired or congenital. In the acquired group there is an elevation of the blood cholesterol level due to myxedema, hypothyroidism, or a number of other diseases. The congenital and hereditary types are rare, but, significantly, they are commonly associated with angina pectoris and myocardial infarction. Obesity should be mentioned as an abnormality which has been reported by some authors to be associated with a high incidence of coronary artery disease.

In summary, there are the following signposts which the clinician notes on the road to atherosclerosis: age, sex, race, familial incidence, hypertension, metabolic disorders, and previous infarctions. These factors may all be considered of importance in the pathogenesis of the disease. Modification of one or more of them may provide an approach to its prevention.

CAPTAIN SCHACHTER: In recent years the influence of diet on lipid metabolism and atherosclerosis has been extensively studied. The epidemiologic studies reported agree consistently on some general conclusions of the highest import. Captain Weiner will survey the field.

CAPTAIN WEINER: Human atherosclerosis is an affliction which progresses at an irregular rate over a period of very many years. By the time the patient presents symptoms of atherosclerosis the disease is already far advanced. Perhaps the active progression of the disease occurs years before the symptomatic consequences. From this, it would seem necessary to study atherogenesis in the absence as well as the presence of overt disease. One approach is to compare different populations, or the same population at different times, in an attempt to correlate various factors with the incidence of atherosclerosis.

Population studies have centered chiefly around the correlation of vital statistics on atherosclerosis with data on dietary habits and serum cholesterol or other blood lipids. In such studies several difficulties immediately confront us. First, vital statistical data may not be comparable from country to country—or even in the same country at different times. Diagnostic criteria and the completeness of such data are different in a primitive society as compared to a modern nation. This problem is a difficult one to resolve. However, the study of different civilizations, the same civilization at different times, and different groups in the same society all lead to the same conclusions. In spite of valid criticisms of these individual studies, there are now enough different observations with similar results to demand serious consideration of their general conclusions. Data on dietary habits are also subject to similar criticisms, especially in retrospective studies. However, in many Western civilizations at least, very reliable estimates of the diets of different populations are available.

The correlation between serum lipids and coronary artery disease, though not one hundred per cent is highly significant. Its predictive value for individual susceptibility to heart disease is relatively low. However, it is quite reliable in predicting the relative susceptibility of large populations to this malady. Groups of patients with coronary artery disease have higher mean serum cholesterol and lipoprotein levels than matched controls with no evidence of disease. Patients with diseases associated with high serum cholesterol levels such as diabetes, myxedema, nephrosis, and abnormalities of lipid metabolism are much more likely to develop coronary artery disease than normals. Biochemical studies indicate that the lipids in atherosclerotic plaques are derived from blood lipids and it would seem possible that high levels in the blood might accelerate the process of arterial deposition.

Animal experiments indicate that serum cholesterol can be greatly influenced by the amount of cholesterol ingested. Most human

observations, however, indicate that in the limited range of dietary cholesterol levels studied this is not true for man. Studies relating serum cholesterol to low-fat intake, on the other hand, have been more positive in nature. Several workers, among them Kempner, Keys, and Chapman,[1-3] have shown that altering the diet from high fat to one low in fat produced significant decreases in serum cholesterol within a few weeks, ranging from 30 to 50 per cent of original levels. The addition of either vegetable or animal fats to the diet reversed this downward trend, but the addition of cholesterol did not.

In the past several years, Ancel Keys and his coworkers at the University of Minnesota[4-7] have studied several populations in an attempt to evaluate the possible relationships between the incidence of coronary artery disease, the diet, and the level of serum cholesterol. His first studies were on a clinically healthy population in the Minneapolis-St. Paul area. These people consume a diet in which fat supplies 40 percent of the calories, a level which apparently holds for most of the United States. He found a mean serum cholesterol level in 20-year-old males of 173 mg. per cent. With increasing age, there was a trend toward increasing serum cholesterol levels to about 256 mg. per cent at age 55, whereupon the levels declined.

Keys also studied a group of English males in an industrial town. These individuals subsist on a diet in which 35.4 per cent of the calories are derived from fat. He found a mean serum cholesterol in this group of 178 mg. per cent for the 20-year-olds, about the same as the Minnesota population, and a trend toward increasing cholesterol levels in the older groups. Another group of workers in Naples, Italy, consumed a diet containing about 20 per cent fat. The Neapolitans had about the same serum cholesterol level in both the 20- and 30-year old groups as the Minnesota and English populations. However, this level did not tend to rise at 40 and 50 years as did that of the earlier populations studied. The serum cholesterol levels of the 50-year-olds were thus significantly below those of a comparable group in Minnesota. Keys also studied two groups in Madrid, Spain, a lower economic class which subsisted on a diet of 2,700 calories, 27 per cent of which were derived from fat, and a rich group of professional men—physicians and lawyers—who subsisted on a diet very much like the American diet in total number of calories and percentage of fat. He found no significant differences between these two groups in the serum cholesterol levels of the young men. Whereas the wealthy group exhibited rising levels with increasing age, the poor population failed to show this same age trend. The mean serum cholesterol of older males of the latter group was significantly lower than that of the comparable wealthy group.

Vital statistics from these various populations indicate that the incidence of coronary artery disease is proportional to the per cent of fat in the diet. Coronary artery disease is quite common in the United States, England, and among the professional people in Madrid. It is much less common among Neapolitans and the poor of Madrid.

Similar studies indicate a low incidence of atherosclerosis in China, Japan, and Okinawa, where the food is low in fat content. Chinese consuming an American diet, on the other hand, have a high incidence of coronary artery disease.[8]

Figure 1, taken from one of Keys's articles[9] shows the relationship between dietary fat and the age specific death rates from degenerative heart disease. This summarizes the individual data discussed. It is clear that there is a marked relationship between the fat calories and the deaths per thousand from degenerative cardiovascular disease, the relationship being much more noticeable in males age 55 to 59 than among males age 45 to 49.

The South African Bantus are a population consisting mainly on vegetables—a diet which, in calories, contains 17 per cent fat. Walker and Arvidsson[10] at the Johannesburg hospital studied cholesterol levels in

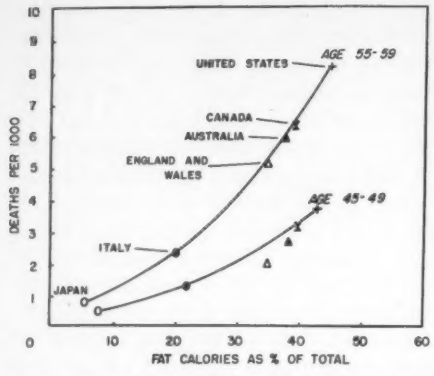


FIG. 1. The relation between dietary fat calories (as percent of total) and deaths due to degenerative heart disease in men (1948-1949). (Permission for reproduction obtained from Editor, *Journal of the Mount Sinai Hospital.*)

Bantus of all ages. They found the mean cholesterol level of the younger age groups comparable to Keys's young Minnesota males. Unlike the Minnesota group, however, there was no significant increase in cholesterol levels of Bantus above age 30, so that in the older age groups the differences in serum cholesterol levels of Minnesotans and Bantus were considerable. Bantus and Europeans in South Africa subsisting on a Europeanized diet had cholesterol levels more like the Minnesota population. Among males between the ages of 40 to 80 years, the Bantu mortality rate from coronary artery disease is about one-tenth of that in the United States.

Because of the marked curtailment of trade during World War II the peoples of Europe were forced to alter their diet, in most instances to one lower in total calories, relatively higher in carbohydrates, and much lower in fat. Vital statistics before, during, and after the war thus provide an opportunity to evaluate these dietary changes in a longitudinal study. The incidence of coronary artery disease and generalized atherosclerosis decreased considerably in Norway between the years 1940 and 1945.[11] This decrease was greater in the urban areas where food and fat restrictions were greater. Rural folk seemed to consume more of their own produce. The incidence of these diseases rose again after the war, at the same time that food restrictions were withdrawn.

Similar results were obtained from analogous studies in Finland and Sweden.[12] No such decline in heart disease occurred in the United States where food consumption was not greatly restricted.

Studies of men in the concentration camps of Europe revealed much lower cholesterol levels in these chronically undernourished people than would be expected in a comparable, adequately nourished group. Sherlock and Walshe[13] found an average serum cholesterol of 166 mg. per cent in a group of undernourished males in Wuppertal, Germany, shortly after World War II. With improved economic conditions between 1946 and 1949, serum cholesterol levels rose significantly in German subjects studied over that period. Autopsy studies during the war on people dying after prolonged malnutrition revealed surprisingly little atherosclerosis. Wilens[14] has presented evidence suggesting that undernutrition and marked weight loss may actually result in the regression of atherosclerotic lesions.

All of these data support the concept that diet, and especially fat in the diet, influences the development of atherosclerosis. The incidence of coronary atherosclerosis in the United States has definitely increased over the past fifty years. Part of this is attributable to our increased life expectancy, bringing more persons into the period of life when coronary artery disease is most frequent. The increase is not solely explained by this, since the age specific rates have also increased. If the diet is a factor, as the evidence indicates, perusal of the change in the American diet over the last forty years is of interest. According to the United States Department of Agriculture, in 1910 the per cent of fat calories in the diet was 31.8. In 1920 it was 33 per cent, in 1930 it was 35 per cent, in 1940 it was 38.3 per cent, and in 1950 it was 40.2 per cent.

According to Keys, this could account for an increase in coronary atherosclerosis of 50 to 100 per cent, a range which is commonly

quoted as the actual increase in the incidence of the disease in American males in the past fifty years.

CAPTAIN SCHACHTER: Lieutenant Renzi will report on some epidemiologic studies in which the factor of physical activity was evaluated.

LIEUTENANT RENZI: A group of British investigators, Morris et al.,[15] have conducted research on the relation of physical activity to coronary artery disease. Two groups of transport workers, namely conductors and drivers, were compared. The duties of the former group demanded more physical activity than did the duties of the latter. Analysis of the data revealed that 39 per cent of the conductors and 13 per cent of the drivers experienced attacks of angina pectoris, which was considered to be the less severe and more benign form of coronary heart disease. Conversely, 31 per cent of the drivers experienced coronary thrombosis, as compared to 19 per cent for the conductors. From these results, it was concluded that individuals whose duties involved considerable physical activity had a higher incidence of the less severe form of coronary heart disease than did the less active individuals; the latter showed a higher incidence of the more severe form. Comparable results were obtained with a group of postal employees.

The vital statistics for England and Wales in the period 1930-1932 indicated that heavy laborers suffered a much lower incidence of the severe forms of coronary heart disease than white-collar workers. As a whole, the observations presented in these studies suggest that physical activity may exert a protective influence. Needless to add, dietary and other factors must also be considered.

CAPTAIN SCHACHTER: Several approaches to the problem of atherogenesis have been presented which implicate the body lipids. Captain Smartt and Lt. Colonel Milch will consider the biochemical approach to fat metabolism and its contribution to this problem.

CAPTAIN SMARTT: The body is in a difficult situation as far as lipids are concerned because the universal solvent of the body is water, and lipids, unfortunately, are not soluble in this material. Thus, some sort of specialized blood transport mechanism for lipid materials is required. This is accomplished by linking these water-insoluble lipids with the water-soluble proteins of the blood.

As fats are ingested, emulsified, and later hydrolyzed in the gut, they are partitioned into two fractions—the water-soluble and the water-insoluble fats.[16] The water-soluble fraction consists largely of salts of the short-chain fatty acids which are absorbed through the intestinal mucosa and directly into the blood. The water-insoluble fraction, which is the larger one, consists of larger lipid particles. These are the long-chain fatty acids, phospholipids, cholesterol, and all the rest of the members of the lipid group. Absorption of this water-insoluble material takes place through the intestinal cell if the particle is less than 0.5μ and if the particle is negatively charged. Otherwise, they pass off in the fecal matter.

After esterification of the fatty acids, they pass into the lymph as the glycerides in chyle. Chyle may take two routes: it may take the lymphatic route to the liver and thence into the blood, or some 70 per cent may take the thoracic route up the thoracic duct and into the left subclavian vein. These lipids empty into the blood stream in the form of chylomicrons which are minute, microscopically visible particles of lipid material, containing little, if any, protein. Clearing of these chylomicrons takes place under the influence of a substance known as "clearing factor." Clearing factor causes the chylomicrons to be broken down into macromolecules which are attached to protein and thereby solubilized for transport. The macromolecules so formed are referred to as lipoproteins because they are a combination of fat and protein. Lipoprotein, then, contains a high-density protein fraction attached to a lipid fraction of low-density. The greater the lipid portion of the lipoprotein, the lower is the lipoprotein's density. Thus,

by ultracentrifugal analysis the plasma lipoproteins may be resolved into a spectrum of relatively light to relatively dense molecules. In ultracentrifugal analysis, the material to be centrifuged—in this case, lipoprotein—is suspended in a solution of greater density than the lipoprotein. On ultracentrifugation the particles thus tend to float, with the less dense ones floating most rapidly. This rate of flotation is measured in terms of Svedberg flotation units or S_f numbers. The faster a particle's flotation, the higher is its S_f number. We have found it convenient to consider the spectrum of lipoprotein particles in three major categories: S_f 0-12, 12-20, and 20-400. The lipoproteins appear to be broken down in the blood in a manner analogous to the chylomicrons, under the influence of clearing factor. The larger, low-density lipoproteins are broken down to the smaller lipoproteins of greater density. This occurs by splitting off lipid—usually fatty acid. This fatty acid then takes one of several routes: it may be utilized as fuel for the body, it may be altered and turned into some substance that the body needs, or it may be stored in adipose tissue.

We know that after a fatty meal human plasma is milky and greasy looking. It is loaded with insoluble lipids in the form of chylomicrons. Within a few hours after the meal the plasma has cleared. There is, however, a substance which can be isolated from tissue and blood called co-protein. And this particular co-protein in the presence of a small amount of heparin gives rise to clearing factor. It has been suggested that slow clearing may occur in atherosclerosis, possibly because of some difficulty in the formation or utilization of the clearing factor.

LT. COLONEL MILCH: From a practical point of view, the diagnosis of simple coronary arterial involvement is inadequate. Almost 100 per cent of the American male population at age 20 have coronary atherosclerosis to at least a minimal degree, as indicated by repeated serial autopsy studies. The problem is not "whether or no." It is "How much?" and "Are symptoms imminent?" Considerable effort has been given, therefore, to arriving at some estimate of the extent of involvement by a clinically feasible test, such as the ultracentrifugal measurement of blood lipoprotein concentration.

As was described for the serum cholesterol, there are certain classes of blood lipoproteins which, by means of statistical population surveys, have been correlated with the clinical manifestations of coronary artery disease in humans. The Gofman group at the Donner Laboratories in California[17] combined the ultracentrifugally determined concentrations of the S_f 0-12 and S_f 12-400 classes of blood lipoproteins into a function known as the atherogenic index or A. I. Specifically, the A. I. is given by the mathematical expression:

$$\text{A.I.} = \frac{(\text{conc. } S_f \text{ 0-12 lipopro.}) + 1.75\,(\text{conc. } S_f \text{ 12-400 lipopro.})}{10}$$

where the lipoprotein concentrations are in milligrams per 100 ml. of serum.

The California group maintains that the numerical value of the A. I. bears a relationship to the tendency or predisposition to coronary atherosclerosis. Within the last two years, these same investigators added a term for the diagnostic pressure to the A. I. and proposed a new criterion called the *alpha function.* Their subsequent statistical population data indicated that if an individual's alpha function were integrated over his life span at any age, the resulting figure would be related to the extent of narrowing of the lumen of his coronary arteries.

Is the Gofman hypothesis valid? In the preliminary examination of any thesis, it is usually profitable to determine if established and documented observations are contravened. Figure 2 shows that humans with increased blood pressure, a condition known to be associated with myocardial disease, also display increased atherogenic indices. Similarly, the data in figure 3 are consistent with the clinical observations that obesity and coronary artery disease are often con-

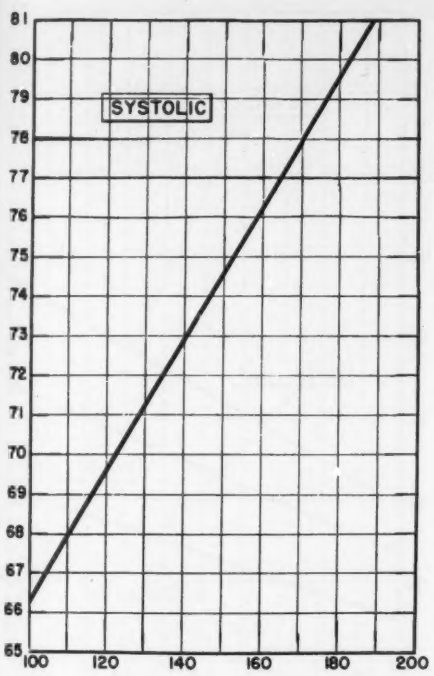


FIG. 2a. Blood pressure (mm.Hg.) (*abscissa*). Average atherogenic index (A.I.) (*ordinates*) values compared with systolic blood pressure.

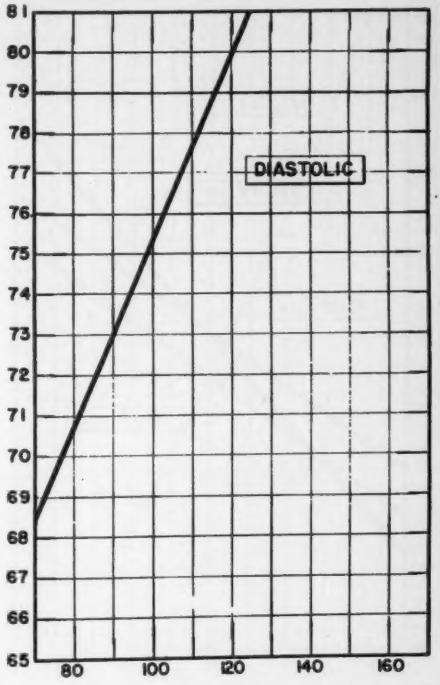


FIG. 2b. Blood pressure (mm.Hg.) (*abscissa*). Average atherogenic index (A.I.) (*ordinates*) values compared with diastolic blood pressure.

comitant phenomena. The graphs indicate that overweight humans, male and female, display increased lipoprotein concentrations. In figure 4, the extent of coronary atherosclerosis as determined by successive autopsies in one population (4a) and the atherogenic index of another population (4b) are plotted as a function of age in human males and females. The similarity of corresponding curves is strikingly obvious.

Summary of figures 2, 3, and 4 yields, in fact, a negative conclusion. All that can be said is that clinical observations relating coronary disease to blood pressure, obesity, sex, and age do not contravene the lipoprotein hypothesis when the atherogenic index is plotted as a function of these same parameters in statistical populations. On the other hand, correlations of a more positive nature have been made among population groups matched with respect to age, sex, obesity, and level of blood pressure. Those groups with very high A. I. values exhibit a higher incidence of coronary atherosclerosis.

The listed data contribute little toward validating a hypothetical cause-effect relationship between blood lipoproteins and coronary atherosclerosis. This finding is not surprising, however. The direct and definitive demonstration of a simple, one-step, cause-effect relationship, in vivo, in any biologic system is quite difficult. In medical research, an ever-increasing mass of data is gradually accumulated, indicating an association between two phenomena until any doubt of their immediate and direct interaction is minimized but does not necessarily disappear. In the instance of the two parameters, plasma lipoproteins and coronary atherosclerosis, the collection of data is in its early stages. Should their hypothetical relation-

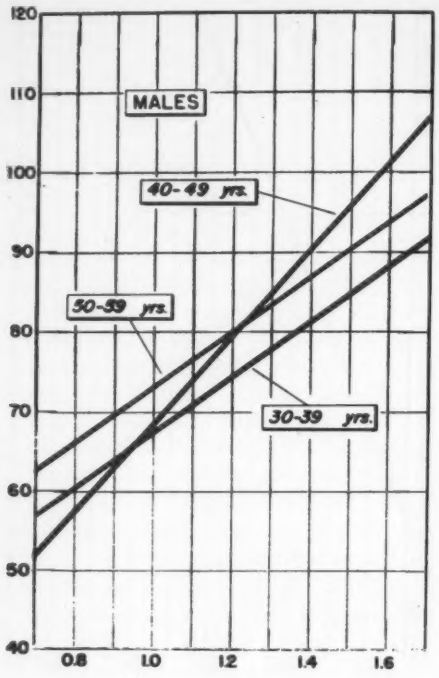


FIG. 3a. Actual weight divided by ideal weight. Weight ratios for males compared with average atherogenic index (A.I.) values (*ordinates*).

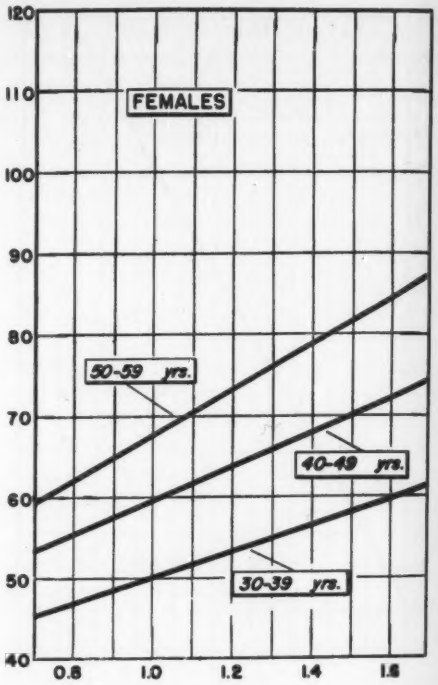


FIG. 3b. Actual weight divided by ideal weight. Weight ratios for females compared with average atherogenic index (A.I.) values (*ordinates*).

ship continue to resist negation in repeated studies involving animals and humans, the requirement for a demonstration of causal relationship will, for practical purposes, cease to exist.

CAPTAIN SCHACHTER: Since statistical interpretations have proved so necessary in these studies, we would like Mr. Rubinstein to offer his critique of the methods used.

MR. RUBINSTEIN: As a statistician I should like to confine my comments to two aspects of the problem of atherogenesis: one is the classification of individuals as to their likelihood of developing the disease; the other concerns the mechanism or causative agent.

Gofman's alpha function and atherogenic index are attempts at comprehensive classification procedures. Gofman's approach is only one of several statistical classification methods that take account of several variables simultaneously, and that may show the interrelationships of the variables considered. These methods have been used with success by psychologists. I believe that the coronary disease researchers should follow their example.

Without wishing to detract from the pioneering spirit of Gofman in using the multivariate approach or from his ingenious definition of the A. I., I do feel compelled to make the following comments on his work as it was presented today. One of these is that he derived the predictive probabilities from the same data on which the A. I. was computed. Such a procedure generally suggests greater discrimination than can actually be obtained. A proper method of evaluating

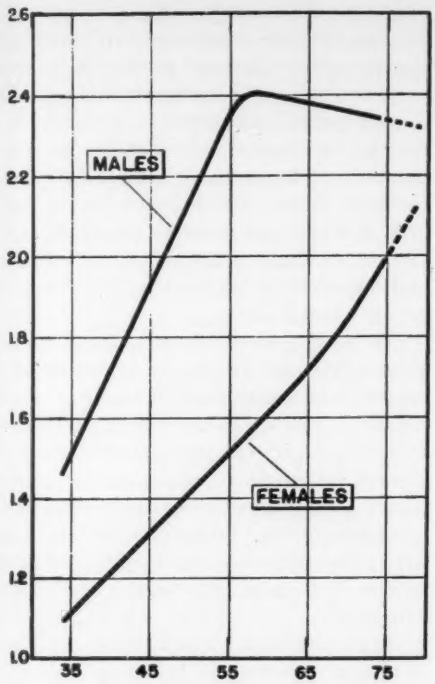


FIG. 4a. Age (years) (*abscissa*). Average grade of coronary atherosclerosis at a given age (17).

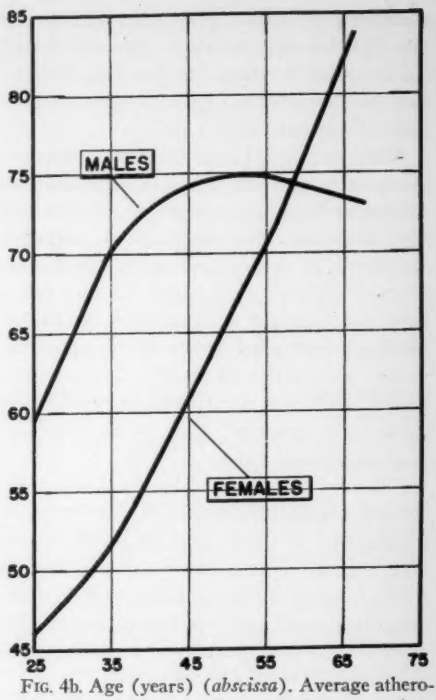


FIG. 4b. Age (years) (*abscissa*). Average atherogenic index (A.I.) (*ordinates*) values at a given age (17).

the predictive values of the indices devised requires verification on subjects not used in establishing the indices. I believe that more variables should have been employed in the discriminant function, particularly the level of serum cholesterol. To demonstrate that serum cholesterol level is not the important criterion and that serum lipoproteins are, all should have been included as variables in the discriminant function.

The persistent associations of fat and coronary disease do suggest at face value a mechanism involving lipids. I should like to state emphatically that association of fats with coronary disease in a population is by itself only inconclusive evidence for a mechanism involving fatty substances. The mechanism or causative agents must be primarily inferred from experimental methods.

One may argue that all cause and effect reasoning depends upon observing associations. However, one must distinguish between associations observed in controlled and manipulated populations and associations observed in populations as they are. To make myself clear, let me describe two situations in which an inference about the effect of a high-fat diet is made.

Situation A. An investigator selects a group of experimental subjects. In this selection he might endeavor to choose subjects as much alike as possible. In spite of careful selection there will be differences between them. When the experimenter divides his subjects into those that will receive the high-fat diet and those that will be fed a low-fat diet he makes the assignments at random to assure unbiased selection. During the entire experiment all subjects are treated alike in all respects except for differences in diet. If under such careful experimentation

a considerably higher proportion of those on the high-fat diet develop coronary artery disease, then the high-fat diet may reasonably be characterized as a causative agent, either direct or indirect.

Situation B. The investigator selects a group of human subjects. He classifies each subject as living on a high- or low-fat diet. He measures the incidence of coronary symptoms in each classification. If the incidence is higher in the high-fat diet group he is not justified in attributing the higher incidence to higher intake of fat. The two groups may differ in wealth, living habits, heredity. Even if no differences between the groups are apparent, there is no assurance that some do not exist.

Some of the studies discussed today involve "retrospective methods" or "matched population." I must warn the audience that faulty inference can easily arise in investigations using these methods, and that the fully integrated participation of the statistician in research projects on atherogenesis can do much to avoid such errors.

CAPTAIN SCHACHTER: Using the information gathered from the multidiscipline approach, let us see if there are some reasonable, tentative conclusions that may help us in setting down a program of prevention. An array of possible pathogenetic factors was presented: fat and its metabolism, obesity, hypertension, heredity, sex, age, physical activity. We may add the possibility of emotional stresses and other factors not yet known. Involvement of fat metabolism in some way—primarily or secondarily—is a recurrent theme in these studies. The pathologic lesion itself contains fat. Clinical situations in which blood fats are elevated are frequently those where atherogenesis is prominent, and, significantly, progression of the latter seems preventable by lowering the lipid levels. Epidemiologic studies of populations indicate a consistent correlation between dietary fat, serum lipid components, and extent of coronary atherosclerotic disease; most impressive was the experience of the Scandinavian countries in World War II, where the incidence of myocardial infarction was dramatically lowered within a period of *two* years subsequent to lowering the dietary fat. Recent advances in the biochemistry of fat transport indicate that positive correlations are found between lipoprotein levels and coronary artery disease. Finally, we might mention the use of various high-fat diets to induce arterial lesions in experimental animals.

Out of the whole list of possible pathogenic factors, are we justified in emphasizing abnormal fat metabolism? Regardless of the degree to which the circumstantial evidence is in accord with this emphasis, alteration of dietary fat would appear to be one of the simplest, most feasible, and most efficacious measures for the prevention, and perhaps even the regression, of atherosclerotic lesions. What would this require, in practical terms?

Most physicians would agree that the avoidance of obesity, by balancing one's total caloric intake and output is desirable. We wish to deal now with one further dietary requirement—that the percentage of calories obtained from fat be kept at a reasonable level. Foods divide themselves rather sharply into two groups, based on their caloric composition with regard to fat: (1) a low-fat group (with 10 per cent or less of the calories as fat) includes most fruits and vegetables, cereals, grains such as wheat and its products (bread, spaghetti), fat-free milk solids and skimmed milks, and some types of sea food—shrimp, cod, flounder. (2) A high-fat group (with 30 to 95 per cent calories as fat) consists of dairy products (butter, 95 per cent; processed cheeses, 60 to 80 per cent; whole milk, 50 per cent; cream, 80 to 90 per cent), eggs (egg yolk, 80 per cent; but egg white only 4 per cent), meats (varying from 30 to 80 per cent depending on visible fat), and some fishes (tuna, salmon, halibut—40 to 50 per cent). Of course, the addition of fat to members

of the first group converts them to the latter category. For example, frying potatoes or codfish in deep fat increases the percentage of fat calories about ten times.

It is evident that expensive and esthetically "good" foods tend to be in the high-fat class, and that poor populations, living mainly on a vegetable diet, will ingest fewer fat calories. The economic level we have attained in the United States enables us to "enjoy" fat-rich diets. In 1910, the diet in this country was about 30 per cent fat, in terms of calories. Today, it is over 40 per cent. To bring the problem close to our personal experience, I estimated, on two successive days, the caloric fat content of the food served by the School of Aviation Medicine Squadron Mess. Total calories were 2,500 and 2,800, and calories obtained from fat constituted 43 and 42 per cent, respectively. I was charitable in not attempting to include the chunks of pork fat, butter, and margarine which inundate the vegetables.

If we could lower the dietary fat of the American adult male to the 1910 level of 30 per cent, significant prevention of coronary artery disease might be attained. This degree of fat restriction would not endanger the nutritional adequacy of his diet. (Please note carefully that we are *not* recommending this dietary alteration for growing children or pregnant women). Further, it would not drastically diminish its palatability. The following four measures would accomplish such a reduction, and they seem sensible and simple:

1. Use only skim milk in place of whole milk.

2. Replace the usual breakfast of bacon and fried eggs with cereal and fruit.

3. Replace ice cream and pastry desserts, in the everyday diet, with fruit and gelatin desserts.

4. Avoid frying foods, substituting broiling, baking, etc. The program we wish to recommend is a two-pronged one. Dietary restriction of fat is one element. The other is increased physical activity, which seems to be an important measure for general well-being in many ways and may specifically prevent atherosclerosis. This program is obviously tentative. It has the merits of simplicity and feasibility. The measures recommended can do no harm and may well be advantageous to health, atherosclerosis aside. It seems wise to recommend them now since definitive proofs may be years in the gathering.

References

[1] Kempner, W.: Treatment of hypertensive vascular disease with rice diet. Am. J. Med. 4:545-577, 1948.

[2] Keys, A., and Anderson, J. T.: The relationship of the diet to the development of atherosclerosis in man. *In* Symposium on atherosclerosis. Natl. Acad. Sciences Pub. 338, N.R.C., Washington, D.C., 1954.

[3] Chapman, C. B., Gibbons, T., and Henschel, A.: The effect of the rice-fruit diet on the composition of the body. New England J. Med. 243:899-905, 1950.

[4] Keys, A., Mickelsen, O., Miller, E. V. O., Hayes, E. R., and Todd, R. L.: The concentration of cholesterol in the blood serum of normal man and its relation to age. J. Clin. Investigation 29: 1347-1353, 1950.

[5] Keys, A., and Keys, M. H.: Serum cholesterol and the diet in clinically healthy men at Slough near London. Brit. J. Nutrition 8: 138-147, 1954.

[6] Keys, A., Fidanza, F., Scardi, V., Bergami, G., Keys, M. H., and DiLorenzo, F.: Studies on serum cholesterol and other characteristics of clinically healthy men in Naples. Arch. Int. Med. 93:328-336, 1954.

[7] Keys, A., Vivanco, F., Minon, J. L. R., Keys, M. H., and Mendoza, H. C.: Studies on the diet, body fatness, and serum cholesterol in Madrid, Spain. Metabolism 3:195-212, 1954.

[8] Katz, L. N., and Stamler, J.: Experimental atherosclerosis. Springfield, Ill.: Charles C Thomas, 1953.

[9] Keys, A.: Atherosclerosis: A problem in newer public health. J. Mt. Sinai Hosp. 20:118-139, 1952.

[10] Walker, A. R. P., and Arvidsson, U. B.: Fat intake, serum cholesterol concentration and atherosclerosis in the South African Bantu. Part I. Low fat intake and the age trend of serum cholesterol concentration in the South African Bantu. J. Clin. Investigation, 33: 1358-1365, 1954.

[11] Strom, A., and Jensen, R. A. Mortality from circulatory diseases in Norway. Lancet 260:126-129, 1950.

[12] Malmros, H.: The relation of nutrition to

health. A statistical study of the effect of the war time on arteriosclerosis, cardiosclerosis, tuberculosis and diabetes. Acta med. Scandinav. Suppl. 246:137-153, 1950.

[35] Sherlock, S., and Walshe, V. M.: Med. Res. Council London, Spec. Rept. Ser. No. 275, p. 123, 1951.

[36] Wilens, S. L.: The resorption of arterial atheromatous deposits in wasting disease. Am. J. Path. 23:793-804, 1947.

[35] Morris, J. N., Heady, J. A., Raffle, P. A. B., Roberts, C. G., and Parks, J. W.: Coronary heart disease and physical activity of work. Lancet 265: 1053-1057, 1953.

[36] Fruton, J., and Simmonds, S.: General biochemistry, p. 519. New York: Wiley, 1953.

[37] Gofman, J. W., Glazier, F., Tamplin, A., Strisower, B., and deLalla, O.: Lipoproteins, coronary heart disease, and atherosclerosis. Physiol. Rev. 34:589-607, 1954.

U. S. ARMY RESERVE HOSPITAL CENTER COMMANDERS

Army Photo

(Left to right)—BRIG. GEN. MANFRED U. PRESCOTT, San Francisco, Calif.; BRIG. GEN. PERRIN H. LONG, Brooklyn, N.Y.; BRIG. GEN. HAROLD C. LUETH, Evanston, Ill.; BRIG. GEN. FRANK E. WILSON, Washington, D.C.; BRIG. GEN. ALEXANDER MARBLE, Chestnut Hill, Mass.

Absent: BRIG. GENERALS TRUMAN G. BLOCKER, Galveston, Texas; CARL S. JUNKERMAN, Columbus, Ohio; HAROLD G. SCHEIE, Philadelphia, Pa.

EDITORIAL

Armed Forces Day

THEODORE ROOSEVELT said, "Speak softly but carry a big stick." The modern version of this and the slogan for Armed Forces Day, May 18, is "Power for Peace."

The United States is a peace loving nation but we have learned that "peace at any price" brings no peace at all. Peace that degrades the spiritual life and the moral values of man is no peace at all. Peace that requires a mailed fist brings resentment, hatred, and discontent. Though that discontent may be inwardly felt, yet suppressed, does not lead a nation to its best efforts. Explosions may occur and do occur.

Here, in America, we are proud that our armed forces do not exist to suppress the American people but to protect their way of life; a way of life that is the envy of many nations of the world; a way of life that we wish to protect for man in whatever nation he may be. This is not aggression; we wish that others could have that way of life but have no intention of forcing it on anyone. They must want it themselves. No, our armed forces are not existing to spread this way of life, rather do they exist to protect it for America and the rest of the world. All this is proclaimed by our President, a soldier himself, but a soldier for peace. Here is his proclamation for Armed Forces Day:

WHEREAS, The armed forces of the United States manifest our strength and our determination to maintain our national freedom and security; and

WHEREAS, Members of the active and reserve components of the armed forces of the United States are engaged in programs designed to demonstrate to all the peoples of the world our purpose to uphold and defend the free way of life; and

WHEREAS, The year 1957 marks the tenth anniversary of the unification of our armed forces under the National Security Act of 1947; and

WHEREAS, It is appropriate that we dedicate one day each year to paying special tribute to the members of our armed forces, and that on such day the armed forces demonstrate to the people of the Nation their operations and capabilities; and

WHEREAS, It is also appropriate that the public be invited to visit on that day, within the limits permitted by security requirements, the posts, camps, stations, bases, vessels, armories, reserve centers, and other facilities:

Now, Therefore, I, Dwight D. Eisenhower, President of the United States of America and Commander in Chief of the armed forces of the United States, do hereby proclaim the third Saturday of May in 1957 and the third Saturday of May in each succeeding year as Armed Forces Day; and I direct the Secretary of Defense on behalf of the Army, the Navy, and the Air Force, and the Secretary of the Treasury on behalf of the Coast Guard, to mark that day each year with appropriate ceremonies, to arrange for demonstrations and displays at armed-forces installations, to invite participation by representatives of all religious faiths in such ceremonies, in order that the interdependence of the deep and abiding religious faith of Americans and our security may be recognized, and to work hand in hand with civil authorities in arranging other supporting activities. I further direct the Secretary of Defense, as my personal representative, to assume the responsibility for initiating, formulating, and supervising policies and procedures in keeping with the proclamation.

I also invite the Governors of the States,

Territories, and possessions of the United States to provide for the observance of Armed Forces Day each year in such manner as will afford an opportunity for the people of the United States to become better acquainted with their armed forces, both active and reserve.

And I call upon my fellow citizens to display the flag of the United States on Armed Forces Day, in recognition of the sacrifice and devotion to duty of the members of the armed forces.

In Witness Whereof, I have hereunto set my hand and caused the Seal of the United States of America to be affixed.

DONE at the city of Washington this fifth day of March in the year of our Lord nineteen hundred and fifty-seven, and of the Independence of the United States of America the one hundred and eighty-first.

(SEAL) DWIGHT D. EISENHOWER

BY THE PRESIDENT:

John Foster Dulles

Secretary of State

Around the World

(Ser. II, No. 9)

By
CLAUDIUS F. MAYER, M.D.

IRAQ, Iran and the rest of the *Middle East countries* have been recently visited by so many tourists that the French owners of *Blue Guides* found it necessary to reissue their volume for travelers in this ancient land (*Moyen-Orient.* Par., 1956). In a short chapter they caution about *the health hazards,* and describe the precautions to be taken. Travelers should be revaccinated against smallpox since the infection is still endemic in certain regions of the Middle East. Other diseases (typhoid, dysentery) can be easily avoided if one follows a few elementary rules. The water supply now is pure and reliable in all big cities, except in some towns of Iran where the modern system of water supply has not yet been introduced. At such places, one should drink the water boiled (in the form of tea), or otherwise sterilized. At certain marshy regions of Iraq and in the Caspian provinces of Iran, malaria is still endemic though the systematic use of DDT has greatly reduced its dangers. As a precaution, the visitor should take one nivaquine tablet (chloroquine) twice a week. Warm clothing is essential in the mountains and highlands of Iran. In the summer, it is best to protect oneself against sunstroke by the use of headgear; the use of dark sunglasses is also wise. The visitor should also know that the many small restaurants and wayside inns at picturesque places offer a lot of highly indigestible native food.

International travel has now reached a very large scale. According to the latest available figures, in 1954, almost eleven million passengers travelled by air, and the number of seafarers also increased. On the North Atlantic route alone, about a million persons were carried in the same year. It is in everybody's interest to prevent the *spread of pestilential diseases* and, though most of the older hazards are now under control, *International Sanitary Regulations* are still of great importance. A report of the World Health Organization on this subject shows that yellow fever and smallpox still remain real nuisances of global transport. (It should be recalled that the International Sanitary regulations were adopted by the 4th World Health Assembly in Geneva in 1951, to replace the many previous international sanitary "conventions" the number of which had been growing since *1851.* The present Regulations entered into force on the first of October, 1952.)

The *Mortlocks* are an isolated group of small atolls lying east of Buka in the Pacific. Here, territorial government officials of Australia found skeletons of many a *native baby buried alive* shortly after birth. The officials are puzzled whether this was an old tribal custom, or a practical application of Malthusian doctrines. Food is very scarce on these atolls where the inhabitants have increased in number from 98 in 1928 to 315 today.

In another part of the Pacific, in *New Caledonia,* the native population is afraid of the fantastic *fertility* of a group of *Indochinese refugees,* and demands their immediate repatriation to Viet-Nam. There are 5,000 refugees: 1,500 men, 400 women, and 3,000 children, which gives an average of eight children per adult female. A measure which has been introduced recently to prompt the refugees to leave is a high special tax imposed upon foreigners.

American investigators found that there are *geographical differences in the spread of toxoplasmosis.* Using the dye test for toxoplasma antibodies, they showed that these antibodies are present in significant amounts (titre 1:16, or over) in the sera of Navajo

Indians (4%), Icelanders (11%), Northwestern Americans (17%), Southern U. S. citizens (31%), Haitians (36%), Hondurans (64%), and Tahitians (68%). The serum of Alaskan eskimos did not contain any antibodies against toxoplasmosis. Positive serological reactions were also found in dogs, cats, cattle, swine, rabbits, and sheep of these regions. Monkeys and rats did not react with the test, but, occasionally, house mice were found infected. In London, 42% of the dogs had shown antibodies against toxoplasma.

Indeed, toxoplasmosis is a widespread infection, and the *Royal Society of Tropical Medicine and Hygiene* also devoted its last January meeting to the discussion of this infectious disease. Various surveys indicated that from ¼ to ¾ of the populations of different countries possessed antibodies against the infection. It is believed that man may become infected by handling raw, contaminated meat. *Reports from New Zealand* also confirm that toxoplasmosis, with or without recognized symptoms, is very common in that part of the world.

The Greek Army Medical Corps is interested in a rickettsiosis, the *Q fever in Greece.* This type occurred in the country long before the last World War but it was misdiagnosed as atypical pneumonia or bronchopneumonia. Since 1946, the military hospitals at Salonike and Larissa, and the various military units at Athens, Korinthos, Tripolis, Macedonia, and elsewhere in Greece, have observed and cured several micro-epidemics of the disease. Sporadic cases occurred in the aviation unit at Sedes, also in other posts near Stavos and at Litokhoron. It was also confirmed that various animals (goat, sheep, cow) were infected with *Coxiella burneti.* The milk of these animals is able to transmit the disease.

Members of the Government Hospital, Tel-Hashomer, and of the Medical Research Laboratories of the Israel Defense Forces studied a small *epidemic of West-Nile fever in Israel* which occurred in the late summer of 1953. The results of their investigations of 70 patients were recently published. In its typical form, the disease appears with moderately high fever (100%), headache (80%), glandular swellings in the armpit (90%) or inguinal region (85%), and some type of roseolar spots (50%). There are many other symptoms and signs which make the recognition of this specific disease almost impossible in sporadic cases. The fever usually ceases in about a week's time, but general weakness, headache, backache, abdominal pains, and swelling of the lymph nodes continue up to two months after the acute phase. The course of the disease is of benign outcome. Though the West-Nile virus is related to some of the agents of arthropodborne viral encephalitides group, neurological complications are very rare in West-Nile fever (few cases of aseptic meningo-encephalitis). There are undoubtedly many abortive and nonrecognized cases of the infection which seems to be endemic in countries of the Middle East.

The New Zealand government recently appointed a commission of three men to investigate the question of *adjusting the fluoride content* of community water supplies. Perhaps, the commission may be surprised by the following bit of information. *Fluorides in the drinking water* are now blamed as the *cause of the mental deficiency* known under the term of mongolism. This is the most recent hypothesis offered by a member of the French Academy of Medicine (J. Rapaport). His reasoning is the following. Dental decay is relatively very rare in mongolian idiots. Indeed, a geographic study of this type of idiocy shows that the condition is most frequent in those American states (Wisconsin, Illinois, and the Dakotas) where mottled enamel, the sign of fluorosis, is endemic. Previous American studies of mongolism showed that the metabolism of the brain, especially the O_2 consumption of the cerebral tissue, is decreased in mongolians. It had been assumed by American doctors that the change in metabolism was the result of an incomplete development of brain enzymes. (We also know that an inhibition of en-

zymatic activity is able to cause mental deficiency, as in phenylpyruvic oligophrenia.) Fluorides in the drinking water of the mother may also act as inhibitors at an early stage in the fetal development of the brain. (Yet, five years of artificial fluoridation of the drinking water have not significantly increased the number of mongoloid idiots in Wisconsin!) By the way! Dentists of Melbourne University call attention to the fact that the chemical form in which fluorides occur in some waters had not been fully investigated. *Naturally occurring fluoride* and added fluoride are known to be different as regards human metabolism, according to some sources. (NOTE: Metabolic differences between normal human beings and mongoloid imbeciles are also being studied at the Harvard Nutritional Laboratories.)

As shown by the experience of troops operating in recent years *in Malaya, leptospirosis* became an *occupational disease of the jungle patrol.* There were 333 cases of such infection observed during 1954 and 1955 in the military population scattered in nearly every state in Malaya. The infection attacked the soldiers without any strong racial preference; yet, the Malayans themselves showed a certain immunity. Certain areas were more contaminated and risky than others. Though the disease caused considerable incapacity, the mortality was low. The country has an extensive population of rodents which are the hosts for many Leptospira species. The disease was usually acquired from contaminated water and mud, or by contact with slime or water. Unfortunately, the disease has not been studied there with the proper facilities of bacteriology and serology. In its clinical appearance, the disease matched the ordinarily accepted textbook description. There is a wide range of symptoms, and signs, which makes diagnosis difficult during the first days of the disease. According to the military reports from Malaya, there is still no specific remedy against leptospirosis.

Pathologists and bacteriologists will deplore the loss of Sir *Lionel Whitby* (1895-1956, Nov. 24) who became famous for his researches in chemotherapy and the discovery of the great value of sulfapyridine in the treatment of pneumonia. In the Army Medical Service of Great Britain he reached the rank of brigadier, and during World War II he was in charge of the Blood Transfusion Service of the British Army. *Dr. Kiyoshi Shiga* (1870-1957), distinguished Japanese bacteriologist and discover of the dysentery bacillus ("Shigella") recently died at Sendai. *Henry E. Sigerist* (1892-1957, March 17), noted medical writer and historian and lifelong promoter of national medical service dispensed by the State, died in Pura, Switzerland, after some years of rather poor health. He had been the director of two institutes pioneering in medical history, one in Leipzig, where Karl Sudhof had called him, and one in Baltimore, where Welch had invited him. It was unfortunate that, after the shift of posts from a European to an American town, his aims and ideology underwent a slow but complete and irreversible change, with strong deviation toward Moskva and dialectic materialism. His planned chef-d'oeuvre, the *History of Medicine,* after the publication of its first volume in 1951, now remains unfinished.

Industrial health groups now recognize everywhere that the expanding industrialization in the world requires a more and more frequent and thorough *readjustment of Man to Machine,* and vice versa. Industrial expansion also brings difficulties in human relations to work-mates, superiors, and subordinates alike. Other forces of life such as fears for health, employment security, and family tensions will affect the mental health of the industrial worker and may bring him nervous and physical fatigue. A leader of the French League of Mental Health (C. Veil) believes that such circumstances justify the employment of many *more industrial psychiatrists* who are able to foresee and to prevent any maladjustment of the workers.

A group of psychiatrists, who congregated at Marseilles, in a symposium on electro-

chemical research into the intermittent mental disturbances in epileptics, has established the diagnosis of *Van Gogh's disease* (he died about 66 years ago). The famous painter committed suicide in the Provence while he was in a crisis of *epileptoid psychosis,* according to the opinion of the symposium.—*Multa paucis.*

NEW YORK CHAPTER MEETING

The New York Chapter of the Association of Military Surgeons of the United States will hold a dinner meeting at the Officers' Club, Governors Island, New York, June 6, preceded by a cocktail hour at 6:00 P.M.

Major General Dan C. Ogle, The Surgeon General, U. S. Air Force, will speaker on "Human Aspects of Flight Into Space."

Guests are invited, including the ladies. Tickets—$5.00 per person. For reservations contact: Dr. Samuel Candel, Secretary of the New York Chapter, 189 Ocean Ave., Brooklyn 25, N.Y.

SUSTAINING MEMBERS

It is a privilege to list the firms who have joined The Association of Military Surgeons as Sustaining Members. We gratefully acknowledge their support.

ABBOTT LABORATORIES
ASTRA PHARMACEUTICAL PRODUCTS, INC.
AYERST LABORATORIES
BAXTER LABORATORIES, INC.
BECTON, DICKINSON AND COMPANY
BURROUGHS WELLCOME & CO. (U.S.A.) INC.
CIBA PHARMACEUTICAL PRODUCTS, INC.
COOK-WAITE LABORATORIES, INC.
CUTTER LABORATORIES
EATON LABORATORIES, DIVISION OF THE NORWICH PHARMACAL CO.
GENERAL ELECTRIC COMPANY
HOFFMANN-LA ROCHE, INC.
JOHNSON & JOHNSON
LEDERLE LABORATORIES DIVISION, AMERICAN CYANAMID CO.
LILLY, ELI, AND COMPANY
MALLINCKRODT CHEMICAL WORKS
MEAD JOHNSON & COMPANY
MERCK & CO., INC.
ORTHOPEDIC EQUIPMENT COMPANY
PARKE, DAVIS & COMPANY
PFIZER, CHAS. & CO., INC.
PICKER X-RAY CORPORATION
PROFEXRAY, INCORPORATED
RITTER COMPANY, INC.
SCHERING CORPORATION
SEARLE, G. D., & CO.
SQUIBB, E. R., & SONS, DIVISION OF OLIN MATHIESON CHEMICAL CORP.
STEPHENSON CORPORATION
STERILON CORPORATION
WARNER-CHILCOTT LABORATORIES
WINTHROP LABORATORIES, INC.
WYETH LABORATORIES

ASSOCIATION NOTES

Timely items of general interest are accepted for these columns. Deadline is 3rd of month preceding month of issue.

Department of Defense

Ass't Secretary (Health & Medical)—HON. FRANK B. BERRY, M.D.
Deputy Ass't Sec'y—HON. EDW. H. CUSHING, M.D.

DOCTOR DRAFT

The Doctor Draft Act expires June 30. Indications now are that the Department of Defense will not ask for its extension, and it is unlikely that if asked for Congress would extend the provisions of the Act.

There has been much opposition to the act and with the increasing number of eligible doctors for call under the Selective Service System the need for such legislation is not as urgent as it was several years ago. There may be a selective selection of physicians for the specialties, however.

Army

Surgeon General—MAJ. GEN. SILAS B. HAYS
Deputy Surg. Gen.—MAJ. GEN. JAMES P. COONEY

ASSIGNMENTS SGO

Col. Bryan C. T. Fenton, MC, who has been Chief of the Medical Supply Division, Office of the Surgeon General, has succeeded Col. Kendrick as Executive Officer in that office.

Col. Paul Hayes, MC, who recently returned from an assignment in Germany, has been appointed as Chief Medical Consultant, Professional Division, in the office of the Surgeon General.

Col. Douglas B. Kendrick, Jr., MC, who has been Executive Officer in the Surgeon General's Office, has been appointed Chief Surgical Consultant, Professional Division, in the office. He succeeds Colonel James H. Forsee who has been transferred to Walter Reed Army Hospital.

Major Nancy Huston, AMSC, who has been consultant in dietetics to the Surgeon, USAFEUR, and Chief, Food Service Division, 130th Station Hospital, has been assigned to the Office of the Surgeon General, Food Service Section, Medical Plans and Operations Division. Her tour will start this summer.

Major Winifred Riley, AMSC, who has been Chief, Food Service Division, Valley Forge Army Hospital, is to hold the double appointment of Chief, Army Medical Specialist Corps Assignment and Chief, Army Medical Specialist Corps Career Planning, Personnel Division.

DEDICATION OF IRELAND ARMY HOSPITAL

The Surgeon General of the Army, Silas B. Hays, dedicated the Ireland Army Hospital, at the U. S. Army Armor Center, Fort Knox, Kentucky, on April 2, 1957. This is the first of the new type Army hospitals to be completed. Col. Kenneth A. Brewer, MC, is commanding officer of the hospital.

The hospital is named after Merritte Weber Ireland, who was Surgeon General of the Army Medical Department from October 4, 1918 to May 31, 1931. General Ireland was a native of Indiana. He received two doctor of medicine degrees, one from the Detroit College of Medicine (1890) and the other from Jefferson Medical Col-

lege (1891). He was commissioned an assistant surgeon from Indiana on May 4, 1891. He served in frontier posts in the west until the Spanish American War when he went to Cuba. On his return he was assigned to St. Louis, Mo., but soon afterwards was ordered to the Office of the Surgeon General in Washington where he became personnel officer, which position he held from 1902-1912. He sailed to Europe in June 1917 with General Pershing and in 1918 he became Chief Surgeon of the American Expeditionary Forces. Upon the retirement of General Gorgas, General Ireland become Surgeon General.

PROMOTED TO BRIGADIER GENERAL

Recently promoted to the rank of brigadier general were officers of the Medical Corps: Paul S. Fancher, Commander, Letterman Army Hospital; Joseph H. McNinch, Surgeon, Army Forces Far East; Roger G. Prentiss, Surgeon First Army; and Clarence P. Canby, Dental Corps, Letterman Army Hospital.

ADVISORY COUNCIL MEETS

The Advisory Council on Reserve Affairs to the Surgeon General of the Army met on April 12 and 13 in Washington, D.C., with Brig. Gen. Perrin H. Long, MC, USAR, 818th Hospital Center Commander, presiding. Maj. Gen. Isidor S. Ravdin, MC, USAR-Ret., was present as a consultant.

The Council is composed of the following members: Brig. Gen. Truman G. Blocker, MC, USAR, Galveston, Texas; Brig. Gen. Carl S. Junkerman, MC, USAR, Columbus, Ohio; Brig. Gen. Perrin H. Long, MC, USAR, Brooklyn, N.Y.; Brig. Gen. Harold C. Lueth, MC, USAR, Chicago, Ill.; Brig. Gen. Alexander Marble, MC, USAR, Boston, Mass.; Brig. Gen. James B. Mason, MC, USAR, Evanston, Ill.; Brig. Gen. Manfred U. Prescott, MC, USAR, San Francisco, Calif.; Brig. Gen. Harold G. Scheie, MC, USAR, Philadelphia, Pa.; Brig. Gen. Frank E. Wilson, MC, USAR, Washington, D.C.

NEW DEPUTY AT WALTER REED

Col. James H. Forsee, MC, who has been serving as Chief Surgical Consultant to the Army Surgeon General, was recently appointed as Deputy Commander and Chief of the Professional Services at Walter Reed Army Hospital. Major General Leonard D. Heaton commands the Walter Reed Army Medical Center and the Hospital.

This marks the third assignment at Walter Reed for Colonel Forsee, who entered the military service in 1929. During this time he has seen duty in many countries, Africa, Sicily, Italy, France, Germany, the Far East and Hawaii.

Colonel Forsee is the author of numerous professional articles on thoracic surgery and pulmonary tuberculosis. One volume, "The Surgery of Pulmonary Tuberculosis" which he wrote in 1954, has been translated into Japanese.

He has been awarded the Legion of Merit (for World War II assignment to the Second Auxiliary Surgical Group); the Oak Leaf Cluster for his Japanese and Korean duty; eleven battle stars; the Medal of Valor from the Italian Government; the Sternberg Medal, for outstanding achievement during his attendance at the Army Medical course; and the Skinner Medal, awarded upon completion of the Army Medical Field Service School course at Fort Sam Houston, Texas in 1935.

Memberships include: American Medical Association, American College of Physicians, American College of Surgeons, American Association for Thoracic Surgery, Western Surgical Association, and Association of Military Surgeons.

He was twice awarded Honorable Mention in the Sir Henry Wellcome Prize Essay competition.

ASSIGNMENT AT WRAH

Colonel John F. Patton, MC, has been named Chief of the Urology Service at Walter Reed Army Hospital. He just returned from Europe where he served as Chief of the Urology Service in the Army hospital at

Landstuhl, Germany and also acted as Consultant in Urology to the U.S. Army in Europe.

NURSE ASSIGNMENT WRAMC

Major Clara M. Duley, ANC, recently joined the staff of the Walter Reed Army Institute of Research, Walter Reed Army Medical Center. She will be Assistant Coordinator of Nursing Activities in the office of Major Harriet H. Werley, ANC, Coordinator, who is also in the Institute's Department of Atomic Casualties Studies.

Major Duley recently received a B.S. degree in nursing education at Indiana University where she majored in teaching in the area of surgical nursing. She has had extensive experience in the field of surgical nursing.

THE KELLER LECTURE

Dr. Isidore Ravdin, John Rhea Barton Professor of Surgery at the University of Pennsylvania, delivered the Fifth Annual Keller Memorial Lecture at the Walter Reed Army Medical Center, Washington, D.C., on March 21, three days before the 83rd birthday of Colonel William L. Keller.

Dr. Ravdin, a retired major general of the Medical Corps of the Army Reserve and a consultant to the Surgeon General of the Army, was presented an Appreciation Scroll signed by Maj. Gen. Silas B. Hays, Surgeon General, and Maj. Gen. Leonard D. Heaton, Commanding General of the Center.

In his address, "Whither Goeth the Surgeon," Dr. Ravdin said: "No words of mine can add to the stature of William Keller. It was he who gave respect and dignity to American Military Surgery. . . . He was a firm taskmaster who had a deep and abiding faith that the . . . continued concern of the surgeon should be his patient. He has lived to see surgery flourish in the Army as he had visualized that it would if men could be trained under excellent circumstances."

Colonel Keller resides with his wife at 2930 Foxhall Road, N.W., Washington, D.C.

SPECIAL X-RAY ROOM

Walter Reed Army Hospital has a new Special Purpose Diagnostic Radiology Room in connection with the operating suite. Special procedures leading to the diagnosis of neurosurgical and cardiovascular diseases can be performed in this new room.

Colonel Elmer A. Lodmell, Chief of the Radiology Service at the hospital said, "Such equipment as is now installed in the Diagnostic Radiology Room has made possible more accurate diagnoses than would have been thought possible just a few years ago and the equipment was found necessary because of the giant strides made in recent years in the fields of brain, chest and heart surgery."

HOSPITAL ACCREDITATION

At a recent lecture to the hospital administration students, Army Medical Service School, Fort Sam Houston, Texas, Dr. Kenneth B. Babcock, Director of the Joint Commission on Accreditation of Hospitals, listed four general rules which guide the Joint Commission in determining which hospitals shall be accredited:

1. Each individual on the medical team must live up to his own responsibilities.
2. Every hospital must have rules established for the common good.
3. There must be records to prove that the rules have been carried out.
4. Members of a hospital team must continually review their activities.

He stated, "We in the United States and Canada have the reputation of having the finest hospitals and medical care in the world. We want to make our hospitals a shining light. Responsibilities for patient care should be disseminated equally in a hospital among the board of trustees, the administrative staff, and the medical staff, all working together for the good of the patient."

PHYSICAL THERAPISTS

At a recent meeting of physical therapists at the Army Medical Service School at

Brooke Army Medical Center, Fort Sam Houston, Texas, Major Barbara M. Robert-

Army Photo

LT. COL. AGNES P. SNYDER, (left) Chief of Physical Therapy Section, SGO, confers with MAJ. BARBARA M. ROBERTSON, Chief of Physical Therapy, Army Medical Service School.

son, Chief of Physical Therapy at the school, pointed out that, "The Army began the first formal training programs in 1922, and since that time it has trained its own physical therapists. Today's program is authorized by the American Medical Association, and the Army Medical Service School course is the only Army course among 37 professional schools in the United States."

JOIN STAFF AMSS

Col. Roy D. Maxwell, one of the Nation's foremost authorities on the effects of nuclear radiation has been named Special Assistant for Mass Casualties Studies to the Commandant of the Army Medical Service School, Brooke Army Medical Center, Fort Sam Houston, Texas. Brig. General Elbert DeCoursey, an authority on the pathology of atomic casulties, is Commandant of the School.

Colonel Maxwell has attended many tests of nuclear and thermonuclear weapons in the Pacific area and at New Mexico proving grounds. He holds a Ph.D. degree in organic biochemistry and has done postgraduate work in radiochemistry and biophysics. He is co-author of several published reports and articles, and a consultant for the Army in the problems incident to radioactive fallout.

NEW BUILDING BAMC

Construction has been completed on the new five-story female officers quarters at Brooke Army Medical Center according to a recent announcement by Major General William E. Shambora, the medical center commander. The building will provide quarters for 200 female officers.

This $1,000,000 building has been named Davison Hall in memory of Major Maude C. Davison, Army Nurse who was captured by the Japanese at Corregidor. She was retired from active duty in July 1946 and died at the Veterans Administration Hospital at Long Beach, California in June 1956.

NATIONAL GUARD NURSE ON DUTY

First Lieut. Sylvia M. Law, the first Army National Guard nurse to serve on active duty, recently attended the 6-week military orientation course at the Army Medical Service School, Fort Sam Houston, Texas.

Her interest in the military medical service led her to participate in voluntary service with the 109th Evacuation Hospital in Birmingham, Alabama, and then when legislation was passed last fall allowing women to be commissioned nurses in the National Guard she made application and was accepted. She praised the course given at the Army Medical Service School.

HONORED

Dr. M. C. Stayer, major general, retired, Director, Bureau of Tuberculosis Control, Pa., has been elected president of the Pennsylvania Chapter, American College of Chest Physicians. Dr. Stayer resides at 504 West South Street, Carlisle, Pa.

RETIRED

Brig. Gen. Don Longfellow, MC, was retired on March 31 after nearly 34 years of service. During World War I he served in the Infantry and after the war entered Indiana University where he was awarded

his B.S. and M.D. degrees. He returned to the Army as a first lieutenant in the Medical Corps in 1925.

General Longfellow has a son, Capt. Don W. Longfellow, MC, on duty at Walter Reed Army Medical Center. The General and his wife live at 1331 Kalmia Road, N.W., Washington, D.C.

Major Louise D. Christman, AMSC, Chief of the Physical Therapy Section, Walter Reed Army Hospital, retired after 23 years as a physical therapist. She entered the Army as a physical therapy student in 1932. She intends to reside in San Francisco, Calif.

Captain John W. Loy, MSC, recently retired after more than twenty years active duty in the Army. His last station was the Walter Reed Army Medical Center.

He was awarded a Battlefield commission while in France and wears the European, African-Middle East Medal with four Bronze Stars for the Rome-Arno, Southern France, Rhineland, and Central Europe Campaigns.

Captain Loy has been chosen for the position of Executive Director of the Montgomery County Medical Society with office in Bethesda, Maryland.

PRAISES USA

A former student of the Brooke Army Medical Center, Captain Efren Jurado Lopez of the Army of Ecuador, recently stated in the *El Universo* newspaper, "No one who has lived in this emporium of culture, of creative energy, of limitless human possibilities that is the United States, and has enjoyed such gratifying experiences, can cease to carry in his heart an indelible affection for such a nation and its people."

INTERNS

The Army hospitals will have 164 graduates from 71 approved medical schools as interns for the year beginning July 1. This is the largest number of medical interns to be admitted at one time by the Army Medical Service since the establishment of such training. The increase is accounted for by the extension of the intern training to the Army hospital at Fort Benning, Ga.

Navy

Surgeon General—Rear Adm. Bartholomew W. Hogan

Deputy Surgeon General—Rear Admiral Bruce E. Bradley

BUMED ASSIGNMENTS

In order to facilitate operations and to provide closer working relationships with the Director, Medical Service Corps Division, Captain Willard C. Calkins, three new codes have been established within the internal organizational structure of the Bureau of Medicine and Surgery.

The new codes have been designated 35B—Assistant for Medical Allied Sciences officers; 35C—Assistant for Optometry officers; and 35D—Assistant for Pharmacy officers.

Commander Kenneth L. Knight, MSC, has been assigned to Code 35B; Commander Robert L. Henry, MSC, to Code 35C; and Lieutenant Commander Solomon C. Pflag, MSC, to Code 35D.

The new codes have been established especially to provide the Division Director with professional advice and assistance in the procurement, career management and effective utilization of members of the concerned sections of the Medical Service Corps. In the past, this assistance has been provided by qualified officers of other Bureau divisions who are now assigned additional duty in the Medical Service Corps Division.

Commander L. F. Elsasser, MSC, has been assigned as Director of the Hospital Administration Division, a new division recently established to develop, evaluate, coordinate and advise on the business management and non-professional administrative needs of Naval Hospitals and other Naval Medical Activities.

INTERNS

The Naval Hospitals will have 200 interns distributed to 15 hospitals, as follows:

Chelsea, Mass.—12; Newport, R.I.—6; St. Albans, L.I., N.Y.—20; Philadelphia, Pa.—18; Bethesda, Md.—20; Portsmouth, Va.—20; Charleston, S.C.—6; Jacksonville, Fla.—6; Pensacola, Fla.—6; Great Lakes, Ill.—12; Bremerton, Wash.—6; Oakland, Calif.—20; Corona, Calif.—10; Camp Pendleton, Calif.—10; San Diego, Calif.—28.

Those selected will be appointed Lieutenants (Junior Grade) in the Medical Corps, U. S. Navy, and Naval Reserve.

RETIRED

The following officers have been placed on the retired list of officers of the Navy: Capt. Asa G. Churchill, MC, (address 909 Hyde St., San Francisco, Calif.); Capt. Richard F. Redden, DC, (address—3530 O'Connor Drive, Lafayette, Calif.); Cdr. Roy T. Brooks, MSC; Cdr. John E. Kelley, MSC; LCdr. Clinton H. Dutcher, MSC; LCdr. Lorne P. Kirkland, MSC; LCdr. Thomas J. Miles, MSC; LCdr John J. Sarsfield, MSC.

MEDICAL RESEARCH BUILDING

Dedication ceremonies for a new wing to the Naval Medical Research Building, Naval Medical Research Institute, National Naval Medical Center, Bethesda, Maryland took place recently.

In the dedication address Dr. Howard T. Karsner, Medical Research Advisor to the Surgeon General of the Navy and an internationally known pathologist said, "This new expansion of the physical plant of the Institute will provide much needed additional space, equipment and facilities so that the research can continue in an increasingly favorable environment and the Navy can look forward to productive research of the highest order."

CORRESPONDENCE COURSE

A new officers correspondence course entitled "Dental Department Administration," is now available for officers of the Navy Dental Corps. This twelve-assignment course has been prepared by the Naval Dental School under the supervision of the Dental Division of the Bureau of Medicine and Surgery.

The course meets an urgent need of the dental officer to familiarize himself with naval organization and administrative functions which have been effected within recent years in dental facilities both ashore and afloat.

PROMOTION POINTS

Inactive Naval Reserve officers become eligible for selection and ultimate promotion by establishing their professional fitness through the earning of the necessary number of promotion points each year that they serve in grade. To qualify for consideration by a selection board, Reserve officers must earn a minimum of 12 promotion points per fiscal year. To qualify for selection and promotion, Reserve officers must earn a minimum of 24 promotion points each year in grade with a maximum not to exceed 144.

Promotion points may be earned as follows:

(a) Completion of appropriate correspondence courses, and

(b) Participation in inactive duty and active duty for training.

Twelve promotion points will be awarded for whichever of the following phases is completed first during any fiscal year:

(1) Attendance at 75% of the prescribed drills of your unit.

(2) Satisfactory completion of fourteen-days active duty for training; or

(3) Satisfactory completion of at least fourteen periods of appropriate duty.

Promotion points will not be awarded for completion of more than one of these three phases in any one fiscal year:

(a) Extended active duty. One promotion point being awarded for each month of continuous active duty served.

(b) Completion of each course in which enrolled in Naval Reserve Officer Schools.

(c) Satisfactory completion of other approved training or instruction with the number of promotion points evaluated or assigned by the Chief of Naval Personnel.

Air Force

Surgeon General—MAJ. GEN. DAN C. OGLE
Deputy Surg. Gen.—MAJ. GEN. W. H. POWELL, JR.

ASSIGNMENT

Maj. General William H. Powell, Deputy Air Force Surgeon General will become Chief Medical Officer of SHAPE, in Paris, in June. He replaces Brig. Gen. Wilford F. Hall.

Veterans Administration

Chief Medical Director—WILLIAM S. MIDDLETON, M.D.
Deputy Chief Med. Dir.—R. A. WOLFORD, M.D.

ASSIGNMENTS

Dr. Walter S. Pugh has been assigned as manager of the Veterans Administration hospital at Wilkes-Barre, Pa. During World War II Doctor Pugh was a medical officer in the Army Medical Service, and at the end of the war was released in the grade of colonel.

Dr. Lawrence C. Davis, a former lieutenant colonel in the Army Medical Service during World War II, has been appointed as manager of the Veterans Administration hospital at Erie, Pa., the position which was vacated by Dr. Walter Pugh.

STATISTICS

The number of veterans in civil life is 22,640,000. Of that number 3,002,000 are from World War I and 129,000 from other wars and the Regular establishment.

The average daily patient load for veterans in hospitals is 116,840, of which 113,756 are in Veterans Administration hospitals. These figures do not include outpatient care.

HOMETOWN MEDICAL CARE

The Veterans Administration is *not* abandoning its hometown medical care program in Michigan or in any other state. This was emphasized by Dr. William S. Middleton, Chief Medical Director.

STREPTOVARICIN

Streptovaricin, a new antibiotic isolated from a fungus found in a soil sample collected in Dallas, Texas, is being tested for its value in the treatment of tuberculosis. The study will be pursued in ten hospitals of the Veterans Administration.

SAFETY PROGRAM PAYS OFF

Veterans Administration employees in 530 hospitals and offices experienced no fatal job accidents during calendar year 1956. Was this just luck? Not according to the Veterans Administration. It was due to the safety program in effect.

Also to be noted as a result of the safety program is the new record low last year in the seriousness of job injuries. Employee work days lost from disabling injuries were 488 per 1,000,000 working hours, the equivalent of one day for each work year performed. This was the lowest rate since records have been kept.

Public Health Service

Surgeon General—LEROY E. BURNEY, M.D.
Deputy Surg. Gen.—W. PALMER DEARING, M.D.

PROMOTIONS

Three Public Health Service career officers now serving as Assistant Surgeons General were advanced to the rank of rear admiral (upper half) or major general. They are: Dr. David E. Price, who will fill a newly created post of Deputy Chief of the Bureau of Medical Services; Dr. Theodore J. Bauer, Deputy Chief of the Bureau of State Services; and Dr. C. J. Van Slyke, Associate Director (for extramural research) of the National Institutes of Health.

Five career officers were appointed Assistant Surgeons General with a rank equivalent to that of rear admiral (lower half) or

brigadier general. They are: Dr. Robert J. Anderson, Chief, Communicable Disease Center, Atlanta; Dr. Albert L. Chapman, Chief, Division of Special Health Services, Bureau of State Services; Dr. J. Roderick Heller, Director of the National Cancer Institute; Dr. Robert J. Felix, Director of the National Institute of Mental Health; and Dr. John D. Poterfield, Assistant Surgeon General in the immediate office of the Surgeon General.

MEDICAL PRACTICE RELATIONS COMMITTEE

The Surgeon General, Leroy E. Burney, recently announced appointment of a committee of physicians to advise him on Public Health Service activities which are related to the practice of medicine.

Members of the Advisory Committee on Medical Practice Relations are: Dr. Stuart Adler, Albuquerque, New Mexico; Dr. C. Byron Blaisdell, Asbury Park, New Jersey; Dr. Hugh H. Hussey, Washington, D.C.; Dr. W. L. Portteus, Franklin, Indiana; Dr. Julian P. Price, Florence, South Carolina; Dr. Stanley R. Truman, Oakland, California; and Dr. William B. Walsh, Washington, D.C.

ASSIGNMENT

Miss Margaret G. Arnstein has been appointed Chief of Public Health Nursing to succeed Miss Pearl McIver who retired.

Miss Arnstein is co-author of a book, "Communicable Disease Control," now in its third edition.

NATIONAL LIBRARY OF MEDICINE

The Board of Regents of the National Library of Medicine, formerly known as the Armed Forces Medical Library, recently elected Dr. Worth B. Daniels, clinical professor of medicine at Georgetown University Medical School, as their first chairman. He will serve one year. Dr. Champ Lyons, professor of surgery, University of Alabama Medical School, was elected vice chairman, and Col. Frank B. Rogers, secretary to the board. Col. Rogers is director of the library.

PAMPHLETS FOR THE SUMMER

The Public Health Service has prepared many pamphlets for non-medical persons. Here are some that are applicable for those conditions arising during the summer months. These can be obtained from the Superintendent of Documents, United States Government Printing Office, Washington 25, D.C. Be sure to mention publication number. Send check or money order. Do not send stamps. Single copies—5¢. In quantities of 100 the price is cheaper.

Asthma	PHS No. 155
Drinking Water Disinfection	PHS No. 387
Hay Fever	PHS No. 208
Hepatitis	PHS No. 446
Hot Weather Comfort	PHS No. 205
Poison Ivy	PHS No. 194
Rabies	PHS No. 97
Ringworm	PHS No. 46
Sunburn and Suntan	PHS No. 104
Sunstroke	PHS No. 176
Snake Bite	PHS No. 188
Swimming	PHS No. 98

Miscellaneous

MEDICAL BOOK NEEDS FOR KOREA FILLED

The American-Korean Foundation and the United States Army Medical Service have announced the discontinuation of their joint project of shipping medical books contributed by individual physicians, medical schools, hospitals and state and local medical societies to Korea.

Books should not be sent to the Sharpe General Depot in California as in the past for facilities no longer exist for packing and transshipping to Korea.

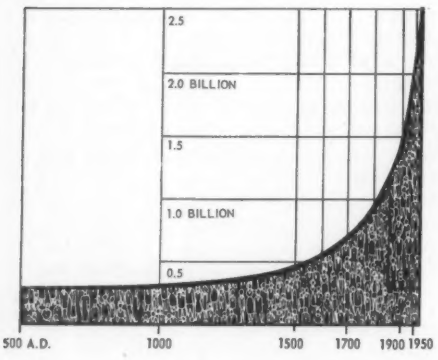
In making the announcement, Howard A. Rusk, M.D., President, American-Korean Foundation said, "The response of physicians and medical groups throughout the country to our appeal for books for Korean medical schools has been so generous that further contributions are not needed." As a result of this program, Dr. Rusk stated, over 77 tons, valued at $76,000, of medical texts, references and periodicals have been shipped to Korea for distribution to Korean medical schools.

PRESIDENT ALUMNI ASSOCIATION

Colonel Roland I. Pritikin, MC, USAR, Rockford, Illinois, while at Shikarpur, West Pakistan, earlier this year was named President of the Henry Holland Hospitals Alumni Association and of the Henry Holland Mission Hospitals Fund.

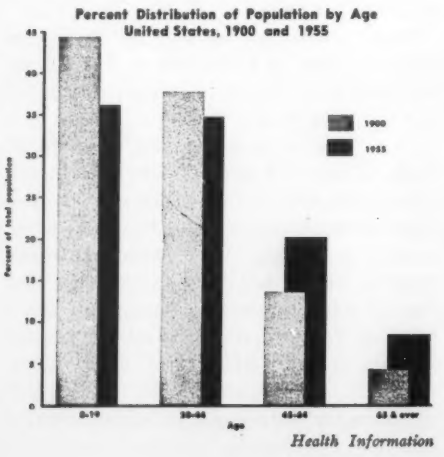
WORLD POPULATION

World population is increasing at an unprecedented rate as this chart shows.



The United Nations estimates that the world population is now growing approximately 40,000,000 a year and that rate of increase is still accelerating.

POPULATION BY AGE—U.S.



Health Information

GRANTS

The 1957 Lederle Medical Faculty Awards amounted to $235,612. Thirteen outstanding medical school teachers and researchers were given awards. Lederle Laboratories is a division of the American Cyanamid Company.

The President of the American Cyanamid Company, Mr. K. C. Towe, said, "The basic purpose of the grants is to help assure to schools and universities adequate funds to encourage medical men of stature to continue in teaching and research posts."

OCCUPATIONAL MEDICINE COURSE

A full-time eight-week course in Occupational Medicine, designed for physicians engaged in the practice of medicine in industry, is being offered from September 16 through November 8, by the New York University Post-Graduate Medical School. For further information write: Office of the Associate Dean, 550 First Avenue, New York 16, N.Y.

RESIDENCIES

Approved residencies in Physical Medicine and Rehabilitation are available at New York University-Bellevue Medical Center beginning July 1, 1957. American graduates with approved internships are eligible for OVR Fellowships, starting at $3,4000.00 per year with added dependency allotment. Make immediate application to: Joseph G. Benton, M.D., Institute of Physical Medicine and Rehabilitation, 400 East 34 Street, New York 16, N.Y.

MEETINGS

The First International Congress of Neurological Sciences will be held in Brussels, Belgium, July 21-28. For further information address Dr. Pearce Bailey, Secretary, Committee for the United States, National Institutes of Health, Bethesda 14, Md.

The 27th Annual Meeting of the Biological Photographic Association will be held at Kahler Hotel in Rochester, Minn., August 27-30. For further information write to:

Louis A. Facto, Morrill Hall, Iowa State College, Ames, Iowa.

The Second European Congress of Aviation Medicine will be held in Stockholm (Saltsjöbaden), September 16-19. For further information address the Secretary General: Dr. Olle Höök, Flygvapnet, Stockholm 80, Sweden.

The XV International Congress of Military Medicine and Pharmacy will be held in Belgrade, Yugoslavia, September 29-October 5. The Secretary General's address is: Nemanjina 15, Belgrade, Yugoslavia.

The Fourth Pan-American Congress of Pharmacy and Biochemistry will be held in Washington, D.C., the week of November 3, 1957 at the Mayflower Hotel. This is a few days following the 64th Annual Convention of the Association of Military Surgeons which will be held at the Hotel Statler, October 28, 29, and 30. The Executive Secretary for the Congress of Pharmacy and Biochemistry is George B. Griffenhagen, c/o Smithsonian Institution, Washington, D.C.

VITAMINS

The Food and Drug Administration has set the figures for minimum daily requirements for niacin at 10 mgm. and for riboflavin at 1 mgm.

GOVERNMENT PUBLICATIONS

Submarine Medicine Practice No. D 213.8/3:959	$2.00
Safety Subjects No. L 16.3:67/4	1.00
Treatment of Chemical War Casualties No. D 101.11:8-285/2	.65
Lecture Series in Nuclear Physics No. Y 3.At 7:8/1175	.65
Safe Handling of Radioactive Isot. No. C 13.11:42	.20
Radiation Sterilization of Foods No. Y 4.At 7/2:F 73	.20
Aging No. FS 1.2: AG 4/6/957	.15

Any of the above may be obtained from Sup't. of Documents, Gov't. Printing Office, Washington 25, D.C. Send check or money order (no stamps).

LIVING

"So live that you would not be ashamed to sell the family parrot to the town gossip." —Rep. J. T. Rutherford (D-Tex.).

"If we did a better job in pursuing those practices that we now accept as safety measures, we would do a lot to cut down the the number of collisions and casualties on our highways."—*Fletcher N. Pratt, Ford Motor Co.*

BENEFIT ASSOCIATION

The Armed Forces Enlisted Personnel Benefit Association was organized on March 10 as a non-profit organization. Membership will be open to enlisted men of all grades in the Regular forces of the Army, Navy, Air Force, Marines, and Coast Guard.

The purpose of the organization is to advance and safeguard the economic interests of the service men. Emergency loans, scholarships for children of servicemen, and low cost Group Life Insurance are the present features pointed out by the directors who are enlisted personnel and Maj. Gen. Robert S. Moore, U. S. Army, Retired, the Advisor.

Headquarters of the Association are at 422 Washington Bldg., 15th and New York Ave., N.W., Washington 5, D.C.

Honor Roll

Since the publication of our last list, the following sponsored one or more applicants for membership in the Association:

Major Samuel A. Barrett, MC, USAR
Henry A. Brzostowski, O.D.
Capt. Bruce L. Canaga, Jr., (MC), USN
Capt. Samuel Candel, MC, USNR
Lt. Cdr. Joseph G. Gershman, MC, USNR
Lt. Col. Wiley H. Horn, VC, USA
Lt. Cdr. Roger Ireland, (MC), USN
Capt. Sidney F. Johnston, (MC), USN
Col. Amos R. Koontz, MC, Md. NG.
Capt. William C. Livingood, (MC), USN
Col. Louis K. Pohl, USAF (MC)
Capt. L. T. Pope, (MC), USN
Col. Arthur J. Redland, MC, USA
Dr. H. C. Smith
Col. August W. Spittler, MC, USA
Lt. Helen P. Steve, (NC), USN

OBITUARIES

Col. Henry F. Philips, U. S. Army, Ret.

Henry Fuller Philips, Colonel, U. S. Army Medical Corps, Retired, died at the Veterans Hospital, Lisbon, Texas on March 4 at the age of 76.

Colonel Philips was a native of Tennessee. He received his medical degree from the University of Texas School of Medicine in 1907 and was commissioned in the Regular Army Medical Corps the following year. In 1908 he graduated from the Army Medical School. He saw service in the Philippines and in 1918 spent a year in Siberia with the U. S. Army forces. He was retired for disability in 1944 and made his home in Dallas, Texas.

He is survived by his widow who resides at 6132 Bryan Parkway, Dallas, Texas, and two daughters, Mrs. A. E. C. Pope, Cedar Valley, Texas and Mrs. P. L. Baines, Winston-Salem, N.C.

Capt. Thomas A. Fortescue, U. S. Navy, Ret.

Thomas Aloysius Fortescue, Captain, U. S. Navy, Retired, died at the U. S. Naval Hospital, Philadelphia, Pa., on February 22 at the age of 72.

Captain Fortescue was a native of Pennsylvania. He received his medical degree from the Jefferson Medical College in 1908. In 1913 he was appointed an Assistant Surgeon in the Medical Corps of the Navy in which he served until May 1, 1947 when he was retired for physical disability.

He is survived by his wife, Mrs. Adelaide B. Fortescue, 114 South Valley Road, Paoli, Pa. Internment was at Arlington National Cemetery.

Maj. Gen. Joseph I. Martin, U. S. Army, Ret.

Joseph I. Martin, Major General Medical Corps, U. S. Army, Retired, died at his home in Santa Rosa, Calif., April 13 at the age of 63. Death was due to a heart attack.

General Martin, a past president of our Association (1955), was born in Chicago, Ill., February 1, 1894. His long military career started after his graduation from the Chicago Hospital College of Medicine in 1918 when he entered the U. S. Army Medical Corps as a first lieutenant. From that grade he rose to the rank of major general in 1949 which rank he held at the time of his retirement on November 30, 1955.

He was an Honor Graduate of the Army Medical School in 1925. He graduated from the Infantry School Advanced Course in 1928, the Command and General Staff School in 1934, and the Army War College in 1940. During World War II he was Chief Surgeon of General Mark Clark's Fifth Army in North Africa, and served with distinction in that capacity until July 1945 when he was transferred to the Pacific Theater. There he became Chief Surgeon of the Western Pacific. In January 1946 he became Chief Surgeon on the staff of General MacArthur's Allied Forces Pacific with headquarters in Tokyo, Japan. Later in 1946 he returned to the United States and became Commandant of the Army Medical Field Service School, Fort Sam Houston, Texas. He became Commanding General of Brooke Army Medical Center and in 1953 became Chief Surgeon, U. S. Army, Europe.

Among his many honors are the Distinguished Service Medal, Legion of Merit, French Croix de Guerre, Order of British Empire, Brazilian Medal of War, and Italian Order of the Crown.

General Martin is survived by his wife, three sons and two daughters.

Interment was in Arlington National Cemetery.

Col. Byrl R. Kirklin, MC, USAR, Ret.

Byrl Raymond Kirklin, Colonel, Medical Corps Reserve, U. S. Army, Retired, died March 2 at Rochester, Minnesota, at the age of 68. Death was due to a heart attack.

Colonel Kirklin was a native of Indiana and received his medical degree from Indiana University School of Medicine in 1914. He practiced radiology in Muncie, Indiana, except for World War I service, until 1925 when he became associated with the Mayo Clinic. There he became Chief Radiologist, and Professor of Radiology, Mayo Foundation, University of Minnesota. He was an internationally recognized authority on x-ray diagnosis. He retired from the Mayo Clinic on October 5, 1953.

During World War I, Colonel Kirklin served in the Army Medical Corps as a first lieutenant. He was instructor in the Army School of Roentgenology at Fort Riley, Kansas and chief roentgenologist at the U. S. Army General Hospital, Fort Bayard, New Mexico.

In 1940 he as a member of the Committee on Radiology of the National Research Council when that committee recommended that every inductee have an x-ray examination of the chest. During World War II, on May 8, 1943, he entered the Army Medical Corps in the grade of colonel and became Senior X-ray Consultant to the Surgeon General.

Colonel Kirklin was author of many articles in medical journals. He was past president (1942-43) of the American College of Radiology. He held honorary memberships in many societies, was a member of the American Medical Association and a member of the Association of Military Surgeons of the United States.

Med. Dir. Edward Francis, U.S.P.H.S., Ret.

Edward Francis, Medical Director, U. S. Public Health Service, Retired, died April 14 at Washington, D.C., at the age of 85.

Dr. Francis was a native of Shandon, Ohio. He received his medical degree from the University of Cincinnati in 1897 and entered the Public Health Service in 1900 and served actively until his retirement in 1937.

He was renowned as an authority on tularemia which he described in 1921. His endeavors carried him into all phases of bacteriology. He contributed many valuable papers to medical literature. Even after retirement his research work continued.

His awards were many. The American Medical Association awarded him the Gold Medal in 1928 for his work on tularemia. Ohio State University conferred the honorary doctor of science degree upon him in 1933; the University of Miami conferred the LL.D. on him in 1929.

He is survived by his sister: Mrs. Annie F. Crafts of Oberlin, Ohio. Interment was at Shandon, Ohio.

The Sir Henry Wellcome Medal and Prize

COMPETITION FOR 1957

THE competition is open to all medical department officers, former such officers, of the Army, Navy, Air Force, Public Health Service, Veterans Administration, The National Guard and the Reserves of the United States, commissioned officers of foreign military services, and all members of the Association, except that no person shall be eligible for a second award of this medal and prize and no paper previously published will be accepted.

The award for 1957, a medal, a scroll, and a cash prize of $500, will be given for the paper selected by a committee composed of the Association's vice-presidents which reports on the most useful original investigation in the field of military medicine. The widest latitude is given this competition, so that it may be open to all components of the membership of the Association. Appropriate subjects may be found in the theory and practice of medicine, dentistry, veterinary medicine, nursing and sanitation. The material presented may be the result of laboratory work or of field experience. Certain weight will be given to the amount and quality of the original work involved, but relative value to military medicine as a whole will be the determining factor.

Each competitor must furnish six copies of his paper which must not be signed with the true name of the author, but are to be identified by a *nom de plume* or distinctive device. These must be forwarded to the Secretary of the Association of Military Surgeons of the United States, Suite 718, 1726 Eye St. N.W., Washington 6, D.C., so as to arrive at a date not later than 1 July 1957, and must be accompanied by a sealed envelope marked on the outside with the fictitious name or device assumed by the writer and enclosing his true name, title and address. The length of the essays is fixed between a maximum of 10,000 words and a minimum of 3000 words. After the winning paper has been selected the envelope accompanying the winning essay or report will be opened by the Secretary of the Association and the name of the successful contestant announced by him. The winning essay or report becomes the property of the Association, and will be published in MILITARY MEDICINE. Should the Board of Award see fit to designate any paper for "first honorable mention" the Executive Council may award the writer life membership in The Association of Military Surgeons, and his essay will then also become the property of the Association.

BOOK REVIEWS

THE RECOVERY ROOM. Immediate Postoperative Management. By Max S. Sadove, M.D., Professor of Surgery (Anesth.) and Head, Div. of Anesth., Univ. of Illinois College of Medicine; James H. Cross, M.D., Clinical Ass't., Professor in Surgery; with contributions by 24 authorities. 597 pages, illustrated. W. B. Saunders Company, Philadelphia and London. 1956. Price $12.00.

A timely, forceful, well written book containing the experiences and recommendations of the authors and 24 authoritative contributors.

The establishment of the recovery room concept has been widely accepted and here is a masterful presentation of conditions and concepts which make for its success. The details of patient care are so thoroughly presented that this should be a most valuable book for the residents. It is especially significant that the senior author depicts the important role that the anesthesiologist now has in the immediate post-operative management of surgical patients.

COL. JAMES H. FORSEE, MC, USA

OCULAR SURGERY. 2nd English Ed. By H. Arruga, M.D. Translated from the 4th Spanish Edition by Michael J. Hogan, M.D., and Luis E. Chaparro, M.D. 948 pages; 1309 illustrations, 123 in color. McGraw-Hill Book Co., New York, Toronto, London. 1956. Price $48.00.

It was a pleasure to read this book. First, I wish to compliment the translators on their excellent work. The main value of this book is its size and illustrations. It is truly a book which gives the eye surgeon all the details he requires in performing practically any procedure in the entire gamut of eye operations.

The encyclopedic character of this work should be mentioned, and the fact that practically every type of procedure that has been used is described. This is evidently for the purpose of acquainting the eye surgeon not only with the origin of various operations, but also their evolution.

The generalities of ophthalmic surgery dealing with the important details of preoperative preparation of the surgeon, operating room personnel, and the patient, are explained with infinite care.

The illustrations are excellent and of sufficient size and detail to explain the text. Explanatory illustrations of large size depict everything mentioned in the book that could be helped by an illustration.

All eye surgeons will like this book for its comprehensiveness. The personality and varied experiences of Doctor Arruga as a physician, surgeon, teacher, lecturer, and writer are reflected in this excellent textbook on Ocular Surgery.

COL. ROLAND I. PRITIKIN, MC, USAR

PSYCHOSOMATIC ASPECTS OF SURGERY. Edited by Alfred J. Cantor, M.D., Editor-in-Chief, American Journal of Proctology; and Arthur N. Foxe, M.D., Editorial Board, Journal of Nervous and Mental Disease. 220 pages. Grune & Stratton, New York and London. 1956. Price $6.50.

This book is a compilation of professional papers and reports from the proceedings of the first annual meeting of the Academy of Psychosomatic Medicine, held in New York City, in October 1954. As indicated by the title of this book, the first meeting of the Academy was devoted to the psychosomatic aspects of surgery.

The premise of this book is reflected by the assertion of the editor that psychosomatic medicine includes all phases of medical practice. He states that the well rounded surgeon, if he is to treat the patient as a whole, must be familiar with the principles of functional and organic defects as they relate to the emotions.

This book is divided into a series of presentations related to the psychologic problems related to surgery. These include problems on anesthesia, cardiovascular surgery, obstetrics and gynecology, cleft palate and orthodontic patients, ambulatory proctology, neurosurgery, orthopedic and plastic surgery and post-traumatic manifestations. The individual papers are discussed by psychiatrists and psychologists. These papers are preceded by the Presidential address on the "Preparation of Patients for Surgery" by William Kaufman, in which he asks the rhetorical question, "Is there anything that doctors can do to prevent the emotional and psychosomatic crippling which can follow technically perfect anesthesia and surgery?" He provides the answer by stating that the principles of psychosomatic medicine require that stress and trauma must be minimized and fear dispelled in order to prevent a stormy emotional course before and after surgery.

Although most successful surgeons have practiced the art of psychosomatic medicine in the management of their surgical patients, it is the opinion of this reviewer that this book provides a rich source

of sound advice and guidance in the psychological aspect of patient care. It is obvious that the various authors of these collected papers have devoted much thought to the improvement of total patient care. The future deliberations of the Academy of Psychosomatic Medicine should prove very fruitful.

COL. DOUGLAS KENDRICK, MC, USA

ROENTGEN SIGNS IN CLINICAL DIAGNOSIS. By Isadore Meschan, M.A., M.D., with the assistance of R. M. F. Farrer-Meschan, M.B., B.S. (Melbourne, Australia). 1058 pages, 2216 illustrations. W. B. Saunders Company, Philadelphia and London. 1956. Price $20.00.

The author, a professor of radiology at various medical schools during the past years, felt the growing need for a work which, in an easily understandable style, would contain all the fundamental concepts, the special technics and procedures of radiologists, and the advanced knowledge necessary for the intelligent use of the x-ray apparatus and the roentgen film in the establishment of diagnosis.

Roentgen diagnosis is based upon the comparison and interpretation of shadows. As a basis of comparison, the shadow of the normal must be known first. With the knowledge of the normal, one is able to distinguish the abnormal shadows, the indications of some pathological process. The next mental step in roentgen diagnosis is the careful weighing of the two-dimensional visual evidence and the differentiation of all possibilities.

According to the three phases of this diagnostic mental process the author planned to treat roentgen diagnostics in three independent volumes:—the first, for the normal radiographic anatomy; the second, for the basic concepts of radiographic pathology; and the third, for the organization of criteria for a successful differential diagnosis and clinical conclusion.

The author's "Atlas of Normal Radiographic Anatomy" was enthusiastically received in 1951; its copies were soon sold out, and even its 1952 reprint is now "out-of-print." The second work of Meschan's radiodiagnostic *trilogy* is the present volume. In 31 chapters it teaches the reader a systematic analysis of the x-ray image in pathological conditions. It teaches him how to recognize the x-ray changes which are abnormal as to size, contour, structure, density, position, and function of the various organs. The first three chapters of the volume contain the basic elements of radiographic technic, methods for protection from irradiation, and the functions of the radiologist.

The style of this textbook is very clear, and the editorial organization of the work is excellent. The illustrations include not only a number of well-defined negative radiograms but also many explanatory diagrams with intelligent legends. These diagrams and the tabulated data contribute a great deal to the practical value of the work. The author based his text upon a wide range of up-to-date bibliography (his latest data refer to publications of 1956). All this gives the book the additional value of a reference work, without the drawbacks of a roentgenographic encyclopedia or of a tiresome dictionary. The very detailed subject index is technically perfect and easy to use. From the typographical point of view also, this volume is an outstanding achievement in printing.

For the richness of its material and the easy grasp of the technical difficulties of an advanced medical specialty, Meschan's work is highly recommended both as a textbook for special postgraduate studies and as a basic reference work for all medical practitioners.

CLAUDIUS F. MAYER, M.D.

SURGERY FOR GENERAL PRACTICE. By Victor Richards, M.D., Professor of Surgery, Stanford University School of Medicine. 947 pages, 476 figures. The C. V. Mosby Company, St. Louis. 1956. Price $17.50.

This book contains a large amount of well organized information about general surgical principles and particularly of surgery involving specialized areas of the head, neck, breast, urology, and the extremities. The first part of the book is organized into a discussion of general principles such as anesthesia, hemorrhage, injury, infection, burns and skin grafting. The pertinent factors pertaining to the understanding, diagnosis and treatment of various diseases in the specialties such as the nose and throat, and urology, are treated from the urologist's or ear-nose-throat specialist's viewpoint. Not only are surgical diseases described, but also the pertinent diseases of these particular specialties, and naturally this includes the medical treatment as well. This is as it should be since the surgeon in this day and time is no longer a technician and should understand related medical problems. In this respect the book is an excellent source of fundamental information of common and varied surgical disorders involving practically all of the surgical specialties.

In my opinion the most valuable contribution of this book is the broad background of the fundamental principles involved that it will give to the reader; and in the same token, its greatest drawback in usefulness is lack of sufficient detail for particular disease problems.

It is especially brief in dealing with abdominal surgical conditions. Pre- and post-operative care and complications are not covered at all.

The chapters which I deem to be especially good are those on the ear, nose and throat, visible and

palpable tumors of soft parts, anal canal and rectum, urology, the group of chapters on central and peripheral neurosurgery, and finally, the orthopaedic problems of the upper and lower extremities.

In view of the recent advances in vascular surgery which antedate this book by several years, the section on the peripheral vascular diseases does not have sufficient detail to give a clear idea of the present indications and possibilities of new surgical treatment.

In summary, I would not recommend this book as a reference book for specific surgical problems, but I do recommend it very highly as a good source for a broad background of understanding of surgical principles and problems for any doctor dealing with a wide variety of medical and surgical patients—the general practitioner, student, or surgical resident.

RAY BROWN, M.D., F.A.C.S.

WILLIAMS OBSTETRICS. 11th Ed. By Nicholson J. Eastman, Professor of Obstetrics, Johns Hopkins University. 1212 pages, illustrated. Appleton-Century-Crofts, Inc., New York. 1956. Price $14.00.

In this edition of Williams Obstetrics, Eastman has maintained the same accuracy in separating fact from theory, the same disregard of fads and fancies, the same meticulous selection of references, and above all the same clarity of expression which characterized his predecessors, J. Whitridge Williams and Henricus J. Stander. The text book remains, as it always has been, an authoritative compendium of sound teaching alike for the undergraduate medical student, the practicing physician and the obstetric specialist.

Among the topics which the author has brought up to date since the previous edition (of 1950) are the toxemias of pregnancy, multiple pregnancy, hydatidiform mole, choriocarcinoma, the importance of fibrinogen in treatment of cases of severe abruptio placentae which show fibrinogenopenia, classification and treatment of the anemias of pregnancy, habitual abortion, postmaturity of the infant, retrolental fibroplasia occurring in premature babies, rupture of the uterine scar in pregnancy and labor following previous cesarean section, and uterine inertia, which the author has redesignated as uterine dysfunction.

New subjects introduced are adrenocortical function in pregnancy, the value of indirect placentography in placental localization, a consideration of factors bearing on the prognosis of labor, obstetric shock, and the physiology of uterine blood flow.

Within the scope of a review such as this it is impossible to discuss each of the subjects listed above. Any points in which this reviewer would differ with Eastman's teachings are minor indeed and, if expressed, would in no way detract from the essential soundness of the views presented.

THOMAS R. GOETHALS, M.D.

INCIDENTS ET ACCIDENTS DE LA TRANSFUSION SANGUINE—Prevention et Traitement. By R. Andre, B. Dreyfus, and Ch. Salmon. 125 pages. Masson et Cie., Paris, France. 1956. Price 1,200 fr.

The authors have succeeded in packing within a relatively few pages an enormous amount of information concerned with the technique and pitfalls of blood transfusion. Not only are they able to draw upon their own very extensive clinical experience, but also they have used the pertinent current literature for frequent reference. The result is a book rich in usable material, with no padding, and entirely up-to-date in its subject.

The authors are aware of the importance of each step in the handling of blood to be used for transfusion: selection of donor, care in taking, preserving and storing the blood, and caution in blood typing and cross matching, but they point out that the accidents of transfusion are less often the result of technical ineptitude. Some accidents will remain unexplained, but it is always necessary to investigate the disease of the patient, his operation, or any trauma that he may have suffered, as possible causes of transfusional difficulties.

The subject of the causes and effect of hemolysis is discussed in detail, with emphasis on the technical means for the prophylaxis of this condition. For the latter they recommend impeccable technique for blood typing and cross matching; the searching out and elimination of dangerous universal donors; and a search for irregular agglutinins and a proof of compatability. Also discussed are the subjects of iso-immunisation during transfusion at childbirth, intolerance to plasma and allergic manifestations, febrile reactions, hepatitis, such transmitted diseases as syphilis and malaria, emboli, and the effects of too rapid overloading of the system during large and prolonged transfusion. Twenty pages of the text are devoted to the technique of blood typing and matching, with special emphasis on tests for compatability. The bibliography is extensive and current. The book would be a useful addendum to the bookshelf of all blood-bank laboratories.

JOHN MARTIN, M.D.

THE TREATMENT OF FRACTURES. By Lorenz Böhler, M.D., Director of the Accident Hospital, Vienna. Translated from the 13th German Edition by Hans Tretter, Helen B. Luchini, Frank Kreuz, Otto A. Russe, and Robert G. B. Bjornson. 1072 pages, 1721 illustrations. Grune & Stratton, New York and London. 1956. Price $24.50.

This is the first volume to be published of a set of three representing the English translation of the German twelfth and thirteenth editions of this standard work.

The last English translation was published in 1935 and it was a single volume of 568 pages. The present edition required ten years of preparation and the first volume alone contains 1072 pages. Dr. Bohler in his preface stated that this extensive revision and expansion were required because in his travels he had observed a wide variety of techniques of fracture treatment among surgeons who believed that they were following his precepts. This revision has resulted in one of the most detailed works that has ever been published. For example, he lists the materials required for the closed treatment of a humeral shaft fracture by a U-splint down to the needle and thread to secure the pads. This is my only criticism of this work. It results in a voluminous and tedious book that is difficult to read. Its principal value should be as a reference for looking up specific problems.

The binding is excellent, the print easy to read and the illustrations, especially the reproductions of the x-rays, are plentiful and superbly done.

CDR. WM. S. STRYKER, MC, USN

CIBA FOUNDATION COLLOQUIA ON AGEING. Vol. 2. Ageing in Transient Tissues. Edited by G. E. W. Wolstenholme, O.B.E., M.B., B.Ch., and Elaine C. P. Millar, A.H.W.C., A.R.I.C. 263 pages, illustrated. Little, Brown and Company, Boston. 1956. Price $6.75.

This is volume two of the "Ciba Foundation Colloquia On Ageing." It is actually a detailed report of the proceedings of the 38th Ciba international symposium held in July 1955, in which 27 European and American authorities participated. Each chapter represents a paper presented by one or more scientists and includes the general discussions that followed each paper. Many topics were discussed including "Organ culture studies of foetal rat reproductive tracts," "The corpeus luteum of the guinea pig," "Mitochondrial changes in different physiological states," "Biochemical evidence of ageing in the placenta," "The growth cycle of deer antlers," and "The metabolism of senescent leaves." The electron microscope was an important aid in these time consuming studies. Since this volume deals with scientific research regarding ageing in transient tissues, it is of especial value to those interested in that subject.

COL. H. P. MARVIN, USA, RET.

CIBA FOUNDATION COLLOQUIA ON ENDOCRINOLOGY. Vol. IX. Internal Secretions of the Pancreas. Edited by G. E. W. Wolstenholme, O.B.E., M.B., B.Ch. and Cecilia M. O'Connor, B.Sc. 292 pages, illustrated. Little, Brown and Company, Boston and Toronto. 1956. Price $7.00.

This represents the discussions of 28 experts, 10 from the United States, in an open discussion held in London in 1955. It extends previous information on other endocrine studies. It represents a series of progress reports in the 17 chapters, each dealing with a specific segment of the problem, complete with illustrations, references and discussion.

The subject of Glucagon (HGF) opens the report, with evidence that it is produced in the *a*-cells of the pancreas, as insulin is produced in the *b*- cells. Administration of synthalin or other chemicals causes disappearance of the *a*- cells, just as alloxan destroys the *b*- cells and cobalt destroys both. This has permitted separation and crystallization of glucagon and the determination of its importance in carbohydrate metabolism and in growth. Chemically, it has been found to be rather similar to insulin, and gives many of the chemical reactions of insulin. The quantity required to produce its characteristic *increase* in blood sugar is of the order of 0.15 gamma/kg. Glucagon inhibits the action of insulin. It has been shown to be an active growth-stimulating factor, associated with the metabolism of fats.

Other reports reviewed the chemical constitution and spatial structure of insulin. Insulin crystals are 8 times larger in molecular weight than any molecule of which the crystal structure has yet been solved, but by making new derivatives with tagged atoms, its structure may be established. It has been shown that the differences in insulin obtained from cattle, pigs and sheep are related to differences in the amino acids, more particularly thronine in the glycyl side-chains. The available evidence suggests that insulin activity is determined by the specific arrangement of some amino acid side-chains, associated with specific configuration of the polypeptide chains and disulfide bonds.

This represents another forward step in correlating research on glucagon and insulin and their metabolic importance.

JAMES C. MUNCH

HEAD INJURIES AND THEIR MANAGEMENT. By Francis A. Echlin, M.D., F.A.C.S., Professor Clinical Neurosurgery, New York University-Postgraduate Medical School. 127 pages. J. B. Lippincott Company, Philadelphia and Montreal. 1956. Price $3.00.

One of the commonest subjects for neurosurgical discussion is that of head injury, yet the subject is never trite, be it treated in a voluminous work or in a brief, lean, pocket-sized monograph such as this one by Echlin. In this book no words have been used redundantly; in fact, the book is hardly more than an outline, completely unembellished and unpadded. However, because of the author's directness

and simplicity of style, the subject is covered remarkably well and the book is recommended as a ready reference for the general principles of the management of head injury.

The mechanism of the injury, the non-surgical and surgical types of injury and their diagnosis and management, the management of complications both early and late, and some special diagnostic aids are discussed. The author has only to recommend sound neurologic and surgical principles, without resort to tricky devices in the care of these challenging patients. His description of epidural hemorrhage is especially good. The remarks on subdural hematoma of infancy and childhood cover the subject in less than four pages, but the information is more practical and to the point than one can usually find it to be in textbooks or current articles on that subject. His advice concerning lumbar puncture should be memorized not only by all medical students, but by many a practising physician who still does not know either the technique or importance of this procedure.

The small size and modest appearance of this book is deceptive. It could well be used for the instruction of nurses, interns and residents, and would be useful in all hospital libraries and accident rooms.

JOHN MARTIN, M.D.

MEDICAL ASPECTS OF TRAFFIC ACCIDENTS. Edited by Harold Elliott, M.D. The Traffic Accident Foundation for Medical Research, The Sun Life Bldg., Montreal, Canada. 1956. (Limited Ed.) Price $7.25.

The report of the proceedings of the Montreal Conference covers medical aspects of traffic accidents in a very complete manner. The first conference was held at McGill University on 4 and 5 May 1955 under the auspices of McGill University and other Canadian hospitals and groups interested in traffic safety. The conference represented a growing realization on the part of professional and related lay groups of the importance of death and injury from automobile accidents.

Beginning with general statistical information, the book deals progressively with school children in traffic accidents and injuries; auto crash injury research; the problem of alcohol in traffic accidents, and many other no less important phases. Emphasized is the importance of education at an early age, and the necessity for a carefully studied approach to the particular local problem with action based in the possible fields of correction. This is defined as "the epidemiological approach."

Most important in the long range reduction of injuries and deaths from auto accidents is information obtained from current auto crash injury research projects. Recommendations proceeding from research of this type result in changes in design of cars which make accidents less dangerous to the occupants, and most certainly will result in great saving of life.

A particularly interesting and informative chapter is that dealing with the medical-legal aspects of chemical tests for alcoholic intoxication. Of great interest and importance in evaluating concentration of blood alcohol in the examination for sobriety is the "Mellanby Phenomenon," an understanding of which is necessary to insure accuracy and fairness of examinations for intoxication. The contribution of alcohol to motor car accidents is stressed, and the importance of a solution to this problem is highlighted. Other drugs, particularly the barbiturates and antihistamines, receive their share of importance in the problem also, coming distinctly within the province of the medical man.

An important contribution is made in the relation of various physical diseases as causative factors in traffic accidents. This portion will be of great value to the physician in private practice in advising his patients. A thorough discussion of nervous system disease and of the importance of the various sensory organs in driving is included.

Of special interest to all medical people are chapters on the handling of traffic victims, including emergency and definitive care. Several pages are of value in the organization of local community traffic safety programs and of equal benefit to a military activity.

The latter portion of the book contains selected abstracts of articles regarding various medical aspects of the accident problem of value to those with special interests.

In all, the book represents in one cover one of the richest sources for information on this topic available today. In a sense, it describes a pioneer effort of medical men to take a proper place in organized effort to reduce injuries and deaths resulting from traffic accidents.

CAPT. GEORGE B. RIBBLE, MC, USN

DIAGNOSTIC PROCEDURES FOR VIRUS AND RICKETTSIAL DISEASES. 2nd Ed. Edited by Thomas Franc's, Jr., M.D., Chairman, Committee on Diagnostic Procedure for Virus and Rickettsial Diseases, American Public Health Association. 596 pages, illustrated. American Public Health Association, 1790 Broadway, New York. 1956. Price $7.50.

This long awaited second volume of a very useful text is certainly a contribution for the microbiologist who finds it necessary to establish a working virus and rickettsial disease laboratory. It is practical and complete.

The twenty-one chapters are all written by authorities with experience in the field. As such, they are able to delineate the present day acceptable methods and the limitations of these methods. The

addition of new tables and figures and the descriptions of the technics for computation of mathematical and end-points all add to the practical value of the new book.

New chapters include: ECHO Viruses, Tissue Culture Methods for the Cultivation of Poliomyelitis and other Viruses, The Coxsackie Viruses, and Miscellaneous Virus Diseases. An excellent introductory chapter on the "General Principles Underlying Laboratory Diagnosis of Virus and Rickettsial Infections" presents a very clear picture of the necessary equipment, collection and handling of specimens for examination, some of the general considerations of the several diagnostic approaches, i.e., microscopic, isolation and serologic methods and the computation of the fifty per cent end points.

It must be realized that this is not a text for the student since it does not present any background for the work although the references are complete. This, however, does not detract from the real value of the text which workers in the field should find invaluable in their routine and research duties.

COL. WARREN C. EVELAND, MSC, USA

OBSERVATIONS ON KREBIOZEN IN THE MANAGEMENT OF CANCER. By A. C. Ivy, Ph.D., M.D., Distinguished Professor of Physiology and Head of the Department of Clinical Science, University of Illinois; John F. Pick, M.D., and W. F. P. Phillips, M.D. 100 pages. Henry Regnery Company, Chicago. 1956. Price $2.50.

In this small monograph the authors have set forth observations made by themselves and 225 other physicians regarding "Krebiozen" and its effect on malignant disease. Early chapters deal with theory behind use of Krebiozen, method of preparing it and plan of investigating it. Detailed data are presented regarding effect of Krebiozen on: (1) cancer lesions, (2) symptoms accompanying cancer, and (3) metastases. Patients are divided into one group of 100 cancer sufferers observed by authors and a second group of 587 patients observed by 225 other physicians. Most cancer patients were in advanced or terminal stages. Case histories of 23 patients who have lived 4 and 5 years after commencing Krebiozen therapy are discussed. Controlled studies are not available but are contemplated.

The authors conclusions regarding Krebiozen treatment in brief are: (1) that it possesses "palliative potency" in 68% of patients with "several different types of cancer," (2) that it "possesses oncolytic properties," (3) its effect is independent "of other forms of therapy," (4) response to treatment "resembles in several respects those to androgen and estrogen therapy in the case of mammary cancer" and then (5) figures relative to ultimate response. Authors contemplate a report on 100 mammary cancer cases and a larger, more detailed monograph on this subject.

Those interested in cancer research and therapy will find much food for thought in this interesting monograph.

COL. H. P. MARVIN, USA, RET.

TODAY'S INDUSTRIAL NURSE AND HER JOB: A STUDY OF THE FUNCTIONS OF NURSES AND THEIR RELATIONSHIP TO INDUSTRY. By Erna Barschak, Associate Professor of Psychology, Miami University, Oxford, Ohio. 113 pages, with tables. G. P. Putnam's Sons, New York. 1956. Price $3.20.

Dr. Marschak has made a survey of fifty-three plants in the Ohio Valley to get a broad picture of the current status of industrial nurses in industry, the size of health units, the sort of supervision they receive, the nature of their duties, the doctor-nurse relationships that apply to them, and the nurses' own professional evaluation of their duties. She has accomplished this task through the use of questionnaires, through personal conferences with nurses, industrial physicians and management officials, and with tours of representative plants of various sizes.

This book affords considerable stimulation to those whose duties involve support or direction of industrial nursing. Preventive Medicine Officers, Post Surgeons, commanders of industrial posts, and nurses themselves can all apply much of the author's inferred recommendations to their own problems and acquire new insight into the proper utilization of industrial nurses.

LT. COL. JOSEPH W. COOCH, MC, USA

DYNAMIC PSYCHIATRY IN SIMPLE TERMS. By Robert R. Mezer, M.D. Senior Staff Psychiatrist, Community Clinic, Massachusetts Mental Health Center and Harvard Medical School. 174 pages. Springer Publishing Company, Inc., New York. 1956. Price $2.50.

This is a delightful little book, an admirable little book. Refreshingly, it is just what its title claims it to be. Written in clear, economical style for medical and nursing students, it merits a far wider audience. Psychiatrists will find it fun to read, since "familiar concepts, suddenly seen in the light of fewer nuances and crowded into a small orbit, . . . appear unusual and even new." Residents preparing for examinations, and physicians in any variety of practice, will value it as an introduction and an armature on which to hang more complicated concepts. Teachers may find themselves tempted to present it verbatim. The one hundred and seventy-four pages are divided into twelve chapters, each followed by a recommended reading list. A general bibliographic orientation is given in a list of ten classic books. The history of dynamic psychiatry is presented, and very neatly too, in eleven footnotes.

THOMAS H. LEWIS, M.D.

NEW BOOKS

Books may be ordered through the Association.

New and Nonofficial Remedies, 1957, Evaluated by the Council on Pharmacy and Chemistry, A.M.A. J. B. Lippincott Co., Philadelphia, Pa. Price $3.35.

Surgical Clinics of North America, W. B. Saunders Co., Philadelphia, Pa. Sold only by the year of six consecutive numbers. Price: Cloth $18.00. Paper. $15.00.

Legal Medicine, edited by R. B. H. Gradwohl, M.D. The C. V. Mosby Co., St. Louis, Mo. Price $15.00.

New Bases of Electrocardiography, by Demetrio Sodi-Pallares, M.D. with the collaboration of Royall M. Calder, M.D. The C. V. Mosby Co., St. Louis, Mo. Price $18.50.

The Early Detection and Prevention of Disease, edited by John P. Hubbard, M.D. McGraw-Hill Book Co., New York, N.Y. Price $7.50.

Muscle Relaxants in Anesthesiology, by Francis P. Foldes, M.D. Charles C Thomas, Publisher. Springfield, Ill. Price $5.50.

The Practice of Medicine, 6th Ed. by Jonathan Campbell Meakins, C.B.E., M.D. The C. V. Mosby Co., St. Louis, Mo. Price $16.00.

Rheumatic Diseases, Rheumatism and Arthritis, by Heinrich G. Brugsch, M.D. J. B. Lippincott Co., Philadelphia, Pa. Price $10.00.

Clinical Laboratory Methods, 5th ed., By W. E. Bray, B.A., M.D. The C. V. Mosby Co., St. Louis, Mo. Price $9.75.

The Fight for Fluoridation, by Donald R. McNeil. Oxford University Press, New York, N.Y. Price $5.00.

Clinical Cardiopulmonary Physiology, editor-in-chief Burgess L. Gordon, M.D. Grune & Stratton, Inc., New York, N.Y. Price $15.75.

The Officer's Guide, 23rd Edition. The Military Service Publishing Co. Harrisburg, Pa. Price $5.00.

Liver, Biliary Tract and Pancreas, by Frank H. Netter, M.D. Part III of Vol. 3, Digestive System, The Ciba Collection of Medical Illustrations.

The Doctor as a Witness, by John Evarts Tracy. W. B. Saunders Co., Philadelphia, Pa. Price $4.25.

Physiologic Principles of Surgery, by Leo M. Zimmerman, M.D. and Rachmiel Levine, M.D. W. B. Saunders Co., Philadelphia, Pa. Price $15.00.

Expectant Motherhood, by Nicholson J. Eastman, M.D. Little, Brown & Co., Boston, Mass. Price $1.75.

Gynecological Management of Urologic Injuries, by Henry C. Falk, M.D. F.A.C.S. F. A. Davis Co., Philadelphia, Pa. Price $7.50.

Meat Hygiene, W.H.O. Monograph Series No. 33. Columbia University Press, New York, N.Y. Price $10.00.

Fractures of the Facial Bones, by W. Wallace Webster, A.B., D.D.S., University of Nebraska Press, Lincoln, Neb. Price $6.50.

Principles of Urology, by Meredith F. Campbell, M.B., M.D., F.A.C.S. W. B. Saunders Co., Philadelphia, Pa. Price $9.50.

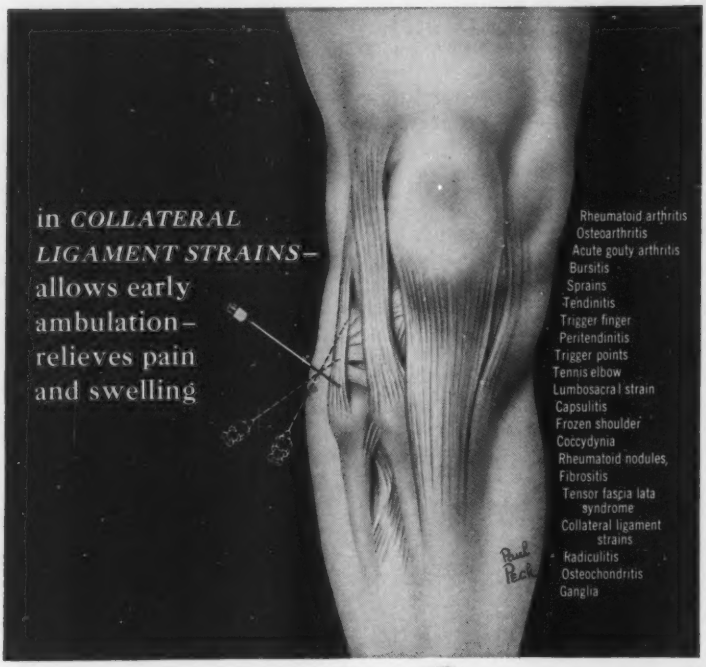
Radiological Health Handbook, S. Kinsman, et al., USPHS, OTS, U. S. Dept. of Commerce, Washington 25, D.C. Price $3.75.

NEW

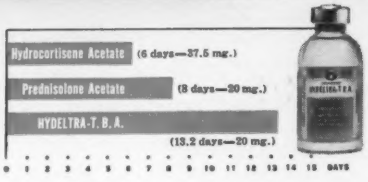
HYDELTRA®-T.B.A.

(Prednisolone tertiary-butylacetate, Merck)

for relief that lasts – longer



Duration of relief exceeds that provided by any other steroid ester


Hydrocortisone Acetate (6 days—37.5 mg.)
Prednisolone Acetate (8 days—20 mg.)
HYDELTRA-T.B.A. (13.2 days—20 mg.)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 DAYS

Dosage: the usual intra-articular, intra-bursal or soft tissue dose ranges from 20 to 30 mg. depending on location and extent of pathology.

Supplied: Suspension 'HYDELTRA'-T.B.A.—20 mg./cc. of prednisolone *tertiary*-butylacetate, in 5-cc. vials.

MERCK SHARP & DOHME
DIVISION OF MERCK & CO., INC.
PHILADELPHIA 1, PA.